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War Demands Are Heavy

And Indications Are That Shipments Will Be Made at Lower Freight Rates—Pig Iron Sold to English Melters

Great activity in buying machine tools, uneasiness at sheet and tin plate plants, owing to threatened labor troubles and close watching of developments in foreign commerce, have been the leading features of the past week. An unexpected development has been the discovery of shippers that in spite of the increased activity of Germany in British waters, chances for making shipments at more reasonable freight rates than have recently prevailed have improved. It is now possible to make more satisfactory freight arrangements on pig iron and the buying of scrap by Italian users indicates that conditions governing movement of freight to Italy are more favorable.

The United States Steel Corporation continues steadily to add to its active capacity, which is now 65 per cent. It has ordered the blowing-in of three more furnaces, one at Gary and two in the Pittsburgh district.

Sheets and Tin Plate

Owing to the rejection by the men of the proposed reduction of 11.2 per cent in the wages of sheet mill workers and 6 per cent in the wages of tin plate workers, serious labor troubles are threatened. Some mills have closed their plants and others are expected to do so. The scarcity of spelter continues to affect the galvanized sheet market and prices have again advanced $3 per ton.

Pig Iron

Cast iron pipe shops in the Philadelphia district have purchased about 40,000 tons of pig iron, 40,000 tons of southern iron have been ordered by buyers in England and the market in Cincinnati and Chicago shows some improvement. Throughout the central west there is an increasing disposition to sound the market for requirements for the last half of the year and sellers express the opinion that large sales could be made at present prices, but as furnaces are not willing to sell at those prices, negotiations have not assumed a definite form. The American Radiator Co. is reported to be in the market, but it is not expected that this company will buy a large tonnage at the present time. Shipments on contracts are going forward very satisfactorily.

Machinery

Machine tool builders in Pittsburgh who had not previously enjoyed much increase in business have within a few days received large orders for turret lathes, grinding and milling machines, which are to be used for the manufacture of shells for belligerent nations. Pittsburgh shops are now working on war materials involving many millions of dollars. An inquiry is pending for 50,000 howitzer shells, involving 20,000 tons of pressed steel. Machinery sellers in the east are still very busy booking orders for lathes and other machine tools. In Cincinnati some machine tool manufacturers are working overtime and the demand for lathes is very active.

Railroad Buying

Railroad buying is still limited to rather small orders for rails and very few orders for equipment. The Southern Railway has placed 6,000 tons additional with the Tennessee Coal, Iron & Railroad Co., and several thousand tons additional have been sold for export. Considerable buying of girder rails has been done by street car companies and 6,000 tons have been ordered for Buffalo lines. The Riter-Conley Mfg. Co. will furnish 8,000 tons of grade crossing work at Indianapolis. The remainder of the 20,000 tons has not been placed.

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A Blast Furnace Record

BLAST furnace operators in all parts of the country are taking a deep interest in the exceptional run being made by the No. 1 stack of the Wisconsin Steel Co., at South Chicago, Ill. This furnace during January maintained an average daily rate of pig iron production of 590 tons on a coke consumption of only 1,658 pounds of coke per ton of iron. The record made by this furnace since it was remodeled and blown in, Aug. 27, 1914, is as follows:

	Pig Iron Production.	Pounds of Coke Per Ton of Pig Iron.
September	13,278	1,904
October	16,801	1,716
November	16,839	1,700
December	17,455	1,702
January	18,295	1,658

The production of this furnace for the month, while high, is not a record for an American blast furnace, as furnace "E" of the Edgar Thomson group of the Carnegie Steel Co. in December, 1901, produced 19,554 gross tons of pig iron with a consumption of about 1,800 pounds of coke per ton of pig iron.

The average coke ratio for the four months, October to January, inclusive, may prove to be a record for American furnaces. The average coke ratio for the four months is 1,693 pounds, a figure considerably below average blast furnace practice in both this country and abroad. The furnace has been making standard bessemer iron with frequent Sunday runs on high silicon iron for foundry use.

For comparative purposes, the following table, taken from Hermann A. Brassert's paper on "American Blast Furnace Practice" presented at the spring meeting of the American Iron and Steel Institute last year, is of interest. It shows the average pounds of coke used per ton of pig iron in a large number of American furnaces in the years given:

Coke per Ton of Iron in American Furnaces

Year.	Per Cent Mesabi.	Pounds Coke.
1902	43.8	2,155
1903	50.3	2,191
1904	55.0	2,239
1905	61.0	2,275
1906	65.2	2,343
1907	68.7	2,362

The remodeling of this furnace was described in THE IRON TRADE REVIEW of Oct. 1, 1914. The stack was designed to provide 15,000 to 16,000 tons of pig iron per month instead of 10,000 tons made by the former furnace. The stack was entirely rebuilt. The skip incline was lengthened and one additional stove was built. The new furnace is 90 feet 6 inches high, with a bosh 21 feet 6 inches in diameter and 12 feet 3 inches high. The hearth is 16 feet 6 inches in diameter. It is 7 feet from the center of the tuyeres to the center of the iron notch. The new stack is on the same lines embodied in No. 2 furnace, which was erected in 1908, but has a larger hearth and steeper bosh walls. The height of the bosh was not increased. The inclination of the bosh walls in the new stack is 78 degrees and 28 minutes.

The Wisconsin Steel Co. uses coke made at its own mines at Benham, Ky., and President Perkins attributes the success of this furnace both to its lines and to the high quality of the coke used, which averages about 93 per cent carbon. A screening device installed in the coke pocket screens the coke as it falls into the skip hoist.

A timely discussion of the question of fuel economy in operating a blast furnace was given at the meeting of the American Institute of Mining Engineers in New York last week, by Walther Mathesius, assistant blast furnace superintendent, Illinois Steel Co., South Chicago, Ill. Fuel consumption at these furnaces has been reduced during the past year by the use of high blast heats. Blast furnace No. 4 during the six months' period, March-August, 1914, averaged 1,745 pounds of coke per ton of pig iron produced. In the 12-month period ending August, 1914, blast furnace "E" operated on an average coke consumption of 1,813 pounds.

The blast furnace operator watches his coke ratio as jealously as the daily tonnage report. The results obtained by the Wisconsin and Illinois steel companies clearly demonstrate the results that have been obtained by a serious consideration of the question of fuel economy, and point hopefully to still further progress. The progress made in blast furnace design

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which has made the 600-ton-a-day stack possible, is likely to be equalled in an adverse ratio, by the reduction in coke consumption from the old-time basis of a ton of coke to a ton of pig iron.

Ignoring Requirements

SOME pertinent facts relating to business conditions and prospects are presented in the annual report of the Pressed Steel Car Co. The statement that for nine years the railroads have ordered less than half of their average requirements of new cars, estimated at 250,000 annually, suggests the query —How long can this policy continue without the railroads becoming woefully deteriorated? The report estimates that in hauling raw material and finished product the ordering of one freight car means the hauling of from 50 to 60 gross tons of freight, or the equivalent of $80 to $100 per car in additional freight receipts. This is putting in a new way evidence of the close relations of the railroads to the steel business and it would be well for railroads of the United States which are now considering the buying of steel rails from a Canadian mill to weigh these and other facts showing how closely the prosperity of the railroads is linked with that of the steel business.

Effect of Worry on Brain Cells

WORRY is a mild form of fright. Fright breaks down brain cells and causes deterioration of brain power. Worry produces similar results. This, in brief, is the theory of Dr. George W. Crile, of Cleveland, the eminent surgeon who returned last week from the American hospital in Paris and the battlefields of France, where he went to assist in taking care of wounded soldiers and to test their blood to determine the effect upon it of the terror of the battlefield.

Dr. Crile's investigations and lectures on this subject have aroused the keenest interest of business men, many of whom realize the danger of overwork and worry. He has shown that in the case of a rabbit frightened by a dog, the actual breaking down of brain cells has been caused and he says that there is no doubt that to some extent similar results follow from worry and excessive work. Dr. Crile has not yet announced the results of his investigations in France, but it is easy to understand that the blood and nervous system of a terrorized man would afford opportunities for study which might result in much practical good to mankind. If by studying extreme cases, resulting from war, Dr. Crile and his assistants can reach conclusions as to the treatment of nervous and mental disorders of those engaged in the strenuous pursuits of peace, they will render service of great value.

Broadening Benefits of a Union

A RECENT report of Richard H. Metcalf, financier of the Iron Molders' Union of North America, is of unusual interest, as it shows the total benefits which the union has paid since it was organized in 1859. These data were collected in order to prepare charts for display at the Panama Exposition. They show that the strike fund was established in July, 1859, and has paid in benefits $4,576,463. The death and disability funds were established in January, 1880, and have paid respectively $936,946 and $105,200. The sick benefit fund was not established until 1896, but it has paid out the handsome amount of $2,522,373. The out-of-work fund, established in October, 1897, has paid benefits amounting to $316,168. The total benefits paid to Dec. 31, 1914, were $8,457,150.

The most encouraging feature of this report is the fact that the benefits have been so much greater and the work so much broader since 1880. Evidently for the first 21 years of the existence of the union the only thought was that it was formed to engage in strikes, but in 1880, in the establishment of the death and disability funds, a realization of the nobler work of a union was recorded, and by the establishment of the sick and out-of-work funds in 1896 and 1897, still further evidence was given of the determination to make the union serve its members in times of industrial peace as well as in times of strikes.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for February, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for Jan., 1915.	Average for Nov., 1914.	Average for Feb., 1914.
Bessemer pig iron, Pittsburgh..	$14.55	$14.70	$14.70	$15.09
Basic pig iron, Pittsburgh.....	13.45	13.45	13.45	14.09
No. 2 Fdy. pig iron, Pittsburgh	13.70	13.70	13.70	14.09
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.00	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.50
Malleable, Bessemer, Chgo.....	13.00	13.00	13.00	14.25
Southern No. 2, Birmingham...	9.50	9.50	9.50	10.50
Southern Ohio No. 2, Ironton..	12.75	12.75	12.63	13.00
Basic, eastern Pa.....	14.00	13.50	13.50	14.25
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X Foundry, Philadelphia..	14.25	14.25	14.25	15.00
Ferro mang., Balti. (prompt)..	100.00	68.00	68.00	38.00
Billets, Pbgh.	20.00	19.50	19.00	21.00
Sheet bars, Pbgh.....	20.50	20.00	19.62	22.00
Steel bars, Chicago.....	1.34	1.29	1.25	1.38
Steel bars, Pittsburgh.....	1.10	1.10	1.10	1.20
Iron bars, Philadelphia.....	1.12	1.15	1.12	1.27
Iron bars, Cleveland, local del'y.	1.15	1.15	1.20	1.30
Iron bars, Chgo. mill.....	1.10	.98	.98	1.20

	Today's prices.	Average for Jan., 1915.	Average for Nov., 1914.	Average for Feb., 1914.
Beams, Chicago	$1.34	$1.29	$1.25	$1.38
Beams, Pittsburgh	1.10	1.10	1.11	1.20
Beams, Philadelphia	1.259	1.25	1.20	1.30
Tank plates, Pittsburgh.....	1.10	1.10	1.09	1.20
Tank plates, Chicago.....	1.34	1.28	1.25	1.38
Tank plates, Philadelphia.....	1.259	1.25	1.20	1.30
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.89	1.94
Sheets, blue an., No. 10, Pbgh..	1.30	1.30	1.39	1.40
Sheets, galv., No. 28, Pbgh.....	3.40	2.77	2.86	2.94
Wire nails, Pittsburgh.....	1.60	1.51	1.59	1.59
Connellsvile fur. coke contr....	1.65	1.69	1.65	1.92
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh.....	11.75	11.55	10.06	12.37
Heavy melting steel, east'n Pa.	10.50	10.00	9.50	11.50
Heavy melting steel, Chgo.....	9.75	8.87	8.25	10.00
No. 1 wrought eastern Pa.....	12.00	12.00	11.50	14.00
No. 1 wrought, Chgo.....	9.00	8.80	7.50	9.44
Rerolling rails, Chgo.....	9.75	9.50	9.50	11.19
Car wheels, Chgo.....	10.00	10.00	10.00	11.75

(For Additional Prices See Page 440)

Big Tonnage of Pig Iron for Pipe

Is Purchased by Foundries in the East—Sales and Inquiries Improve at Cincinnati—American Radiator Co. Again in Market

Philadelphia, Feb. 20.—Further covering by cast iron pipe foundries in this territory, of their requirements accruing from recent orders for pipe, calls for a heavy tonnage of pig iron. One of the Delaware river companies closed in the week for 30,000 tons of iron for shipment to its two shops in this district. Of this block, 25,000 tons were Alabama grades and were purchased on the basis of $9.25, Birmingham, for No. 2 and 5,000 tons were eastern Pennsylvania metal, which was obtained at the recent range for northern pipe iron of $13.25 to $13.50, delivered. This transaction, with previous sales to the Standard Cast Iron Pipe & Foundry Co. and the United States Cast Iron Pipe & Foundry Co. and to other similar consumers, brings the total of recent pipe iron sales in this district to not less than 40,000 tons. The whole market shows a slight improvement in miscellaneous buying. A steel company in the city bought 3,000 tons of standard low phosphorus iron at the full schedule of about $20, Philadelphia. Other low phosphorus sales of the week were small. Miscellaneous foundry iron orders, though usually small, are more numerous. A lot of 300 tons of eastern Pennsylvania No. 2 plain for early shipment was done at $14.40, Philadelphia. A road machinery builder still figures on 600 tons. The market at Philadelphia or vicinity is unchanged at $14.25 to $14.50 for No. 2X. There have been no further developments in basic since the buying by a Harrisburg steel works previously noted. No inquiry now is pending. The present indications are that one of the Thropp furnaces at Earlston will resume about March 1. The 5 per cent advance in freight rates in eastern territory becomes effective on pig iron Feb. 23.

Pig Iron Moving Well

Pittsburgh, Feb. 23.—February has not witnessed any buying of consequence in pig iron circles, mostly because consumers covered first quarter needs before the close of last year. Sales this week have involved a 500-ton lot of bessemer for shipment to Cleveland at $13.60, valley; 100 tons of high silicon bessemer for delivery to a consumer in the immediate locality, at $14, furnace, and numerous small tonnages of foundry and malleable grades, which commanded from $13 to $13.50, valley. Specifications against contracts have been fairly satisfactory. Foundry iron sellers are shipping twice as much metal this month as they did in January, and shipments of steel-making iron have held their own. Jobbing foundries are not busy, but shops connected with large manufacturing interests have been melting moderately heavy tonnages. Malleable iron foundries in this district do not expect to enjoy activity until the railroads cover needs. Recently compiled figures indicate steel foundries in the country operated at 42 per cent of capacity in January; the average for Pittsburgh was about 35 per cent. Canadian steel foundries, the initial month of the year, it is interesting to note, produced only about 12 per cent of capacity.

Inquiring for Last Half

Chicago, Feb. 23.—Indication that buyers believe pig iron prices will be higher for second half than at present is found in the greatly enlarged inquiry now coming out for deliveries after July 1. The trade now has before it in this territory inquiries aggregating between 10,000 and 15,000 tons for last half delivery, practically all for No. 2 foundry. This aggregate is made up of tonnages of considerable size, from 1,000 tons upward. For the most part, it is from manufacturers who make their own castings and

(*For complete prices see page* 440.)

comparatively little is asked for by jobbers who manufacture castings for others. A characteristic inquiry is from a maker of sanitary appliances who is willing to take 5,000 to 6,000 tons during second half if the price is attractive. This inquirer also desires a considerable tonnage of high silicon iron.

Inquiry in small lots is being received for immediate delivery and through second quarter, although this tonnage does not aggregate heavily. For second quarter, northern sellers are asking $13, Chicago, without concessions and with strict adherence to silicon content, while for second half $13.50, Chicago, is being held stiffly without concessions in silicon.

Southern sellers are asking from $9.50 to $10, Birmingham, and some sales are being made at the higher figure. Under the circumstances of competition, comparatively little southern iron is being sold except into competitive territory, as northern prices are too low for successful competition directly into Chicago.

One Strong Feature

Cleveland, Feb. 23.—The very satisfactory rate at which shipments are being made from lake furnaces continues to be a strong feature of the present situation. Some sellers express the opinion that they could take large orders for last half delivery at present prices, but this they are unwilling to do, and as nearly all consumers are pretty well covered for the first half of the year, there is very little buying at the present time.

Shows Improvement

Cincinnati, Feb. 23.—Sales and inquiries have improved considerably in the pig iron market during the past week and the situation today is much more optimistic than at any time since the first of the year. The Bonney-Floyd Co. has purchased around 500 tons of low phosphorus iron and numerous sales ranging from 100 to 200 tons have been made in all parts of this territory, principally through solicitations by salesmen. The Nordyke & Mormon Co., Indianapolis, is inquiring for 800 tons of northern and southern foundry iron and an inquiry is out from southern Indiana for from 900 to 3,000 tons of northern and southern grades. Two inquiries, one for 2,000 tons of malleable iron and one for 1,000 tons of northern iron, are pending in central Ohio. A southern Ohio melter has closed for 600 tons of northern foundry iron at market prices. Shipments on old contracts are going forward in a satisfactory manner in most cases. Quotations are unchanged, southern No. 2 foundry iron being quoted at from $9.50 to $10, Birmingham basis, and southern Ohio No. 2 foundry iron from $12.75 to $13.00, Ironton basis, for first half delivery. Very little iron has been sold for shipment over the second half and prices in most of these cases have been of a special nature.

Improvement Noted

St. Louis, Feb. 22.—Sales of pig iron in the local market brightened up a little toward the close of last week, resulting in two orders each for 500 tons of southern No. 2, and one order for 200 tons of northern iron. An inquiry made its appearance today for 300 tons of southern No. 2. Southern pig is still quoted at $9.50 to $10, Birmingham basis, and local agents fail to see any improvement in the immediate future. Northern iron also is dull, and offered at $13 to $13.50, Ironton and Chicago.

Alabama Iron for Export

New York, Feb. 23.—Much interest has been shown in the pig iron market in this territory the past week in a sale of 40,000 tons of Alabama iron made by a leading southern maker for shipment to England. Not all the details of this transaction yet are known. It is not certain whether foundry or steel-making iron figured.

Other inquiries for export still are being negotiated and the fact that more favorable freight accommodations are possible in some directions increases the probability of further sales. Only small-lot buying prevails in the local market for the domestic trade. According to current reports, the American Radiator Co. is a prospective buyer of a large tonnage. Several months ago, this consumer closed for a round block estimated to have been about 200,000 tons, but took this metal more as an investment because of the low price than immediate consumption. It now is reported that this tonnage will be kept in the yard and purchases will be made for current needs. Among the inquiries that remain in the market are 800 tons of foundry for a southern car wheel company, 400 tons for an Elizabeth, N. J., buyer, 250 tons of malleable for a New Jersey consumer and other miscellaneous lots. Quiet negotiations involve several thousand tons in addition. Prices show no appreciable change, but Buffalo iron has been offered in this territory at $12.50, basis, some of which may have been resale metal. The 5 per cent increase in freight rates, effective today, makes the new charges as follows: Lehigh valley to tidewater, 74c per ton; Schuylkill valley to tidewater, 95c; central Pennsylvania to tidewater, $2.16; Buffalo to tidewater, $1.84 to $2.10; Buffalo to New England, $2.58; central Pennsylvania to New England, $2.48; eastern Pennsylvania to New England, $2.

(*For complete prices see page* 440.)

Little Activity at Buffalo

Buffalo, Feb. 23.—The activity of the week is of the hand-to-mouth variety, sales being confined largely to limited tonnages, carload lots, etc. Prices remain unchanged. Shipments are going forward in good volume from the furnaces of the district, considerable tonnages being taken out under the contracts placed some time ago by the leading radiator, boiler, machine and tool interests.

The producers report that most of the users are covered for the first quarter requirements, and before entering the market for second quarter figures, have adopted a policy of waiting to see what will be the business outlook by the time that second quarter opens.

No. 3 foundry is being quoted at $13, f. o. b., Buffalo. Prices remain firm in accordance with the schedule previously announced.

Three Furnaces

Ordered In By Steel Corporation—Some New Rail Orders

New York, Feb. 24. (By wire.)—The United States Steel Corporation has ordered in three more furnaces, one Gary, one Carrie and one Clairton. It now is operating 65 per cent of ingot capacity. Its plate mills are doing better. Its rail mills both at Pittsburgh and Gary are running.

Rail orders still are miscellaneous. The Southern railway gives the Tennessee Coal, Iron & Railway Co. 6,000 tons additional. Several thousand tons additional have been sold for export. There is good buying of girder rails and track accessories by street car lines. The Lorain Steel Co. recently has taken about 15,000 tons of girder rails much of which has been previously reported. A new order for 6,000 tons for Buffalo has been placed.

The Riter-Conley Mfg. Co. will furnish about 8,000 tons of the Indianapolis grade crossings. The remainder of the 20,000 tons has not yet been placed.

Tubular Goods

Pittsburgh, Feb. 23.—All makers of steel and iron pipe are asking advanced quotations announced the early part of the month, and, so far as can be ascertained, no concessions are being offered. Galvanized products, which were advanced from $2 to $6 a ton, show no signs of weakness. No large orders are reported this week.

Licenses for Ferro

Granted by Enemy Trading Committee of English Government, But Conditions Are Still Serious

New York, Feb. 23.—Licenses finally have been granted by the enemy trading committee of the British government, for the exportation of about 5,000 tons of ferro-manganese monthly to consumers in the United States, but some questions pertaining to the distribution of this quantity remain to be adjusted and it still is uncertain when actual shipment will begin. That these questions regarding the division of the tonnage are of considerable importance and are effectually blockading the resumption of shipments is illustrated by the fact that the action of the government authorities was taken two weeks ago and no advice of sailing yet has been received by sellers on this side.

The 5,000 tons of ferro-manganese monthly which the British government is willing to release represents in the estimate of these authorities about the present consumption of merchant ferro-manganese in this country. It very evidently is the purpose of the British authorities not to allow to come forward more than the actual quantity needed for steel works operations in this country. The amount specified will be about one-half of the normal monthly consumption of imported ferro-manganese by steelmakers of the United States. Users, it is understood, will receive pro-rated quotas, one-half of which will be under old unfilled contracts at low prices and one-half at new purchases made at $68, seaboard, under the recent plan of "marrying contracts", previously outlined.

Situation Remains Serious

While it is apparent from the granting of licenses that the holders of unfilled contracts with English makers will be taken care of, the situation, with respect to those companies which have no such contracts, and especially the smaller users, remains serious. The tense condition of the spot market, as a consequence, continues and is not likely to undergo much change in the near future. A resale lot of about 12 tons by a New England plant within the week brought $90 in the seller's yard. An eastern steel company which recently asked for 200 tons of prompt is understood to have obtained some material at a high price. Sales of one, two and three-ton lots at $150, seaboard, are reported by some sellers. There has continued during the past week considerable selling at $68, seaboard, of material to come in when shipment is possible. These have totaled probably 3,000 to 4,000 tons and usually have been made in connection with lower-priced contracts outstanding, under the plan proposed recently by the English makers.

The spiegeleisen market has continued active and inquiries both for domestic and foreign consumers have been numerous. Some good-sized transactions have been closed and one lot of several thousand tons for export has been placed. The leading domestic seller now is understood to have sold so freely that it has withdrawn all prices.

Ferro Situation Acute

Pittsburgh, Feb. 23.—The ferro-manganese situation appears to be more serious. The lifting of the English embargo is not expected for at least several weeks, possibly months, and the activity of the Germans on the seas the last 10 days has greatly increased the dangers and uncertainties of shipping. Ferro-manganese already has sold at $100, Pittsburgh; as high as $120, seaboard, has been offered by anxious consumers, and at least one dealer is refusing to shade $125, seaboard, for this alloy. Ferro-manganese stocks in this country, dealers say, will be exhausted within 60 days, and considerable embarrassment will be felt unless relief soon is offered. To conserve ferro-manganese supplies, many consumers are using spiegeleisen whenever possible. The interest at Dunbar, Pa., recently advanced quotations for spiegel from $25 to $26, and now is refusing to quote less than $28, furnace, for 20 per cent material. The product of the Bessie Furnace Co., consisting of lower grades of ferro-silicon, is being offered the trade by the Allan S. Davison Co., Pittsburgh.

Scrap Market Broadens

In Eastern Pennsylvania Territory—Steel Makers Show More Interest—Dull in Other Centers

Pittsburgh, Feb. 23.—The iron and steel scrap market in the Greater Pittsburgh district is quiet. More important melters are under cover for the present and are refusing to pay more than $11.75, delivered, for heavy melting steel. Other grades are quiet, and unchanged in position.

Market Broadens and Rises

Philadelphia, Feb. 22.—A further broadening of buying has appeared in the old material market in eastern Pennsylvania during the past week and several grades have scored advances. Steel makers manifest a little more interest in steel scrap. A Schuylkill valley buyer now has offered $10.50, delivered, for some tonnage of heavy melting steel and another eastern Pennsylvania works has closed for about 2,000 tons at $10.25, delivered. It looks like any round tonnage would bring at least $10.50, delivered. A Lebanon consumer who has been buying wrought pipe freely has been paying $10.25, delivered. No. 1 railroad wrought freely commands $12, delivered. A number of foundries have been coming out for heavy machinery cast and the market has advanced to $12.50, delivered. For rerolling rails, buyers have offered $11, delivered. Stove plate has been done at $9.50, delivered. Small sales of low phosphorus at $13.50, delivered, are noted, but $14 could be obtained for first quality. England and Italy still continue receptive bidders for 10,000 tons each of heavy melting steel, but no exportation is possible at the present freights.

Scrap for Italy

New York, Feb. 23.—Italian buyers who have been figuring with various sellers in this country for 5,000 to 10,000 tons of crop ends now have closed for about the larger tonnage. The price is reported to have been about $12, delivered alongside the steamers. Dealers show more conservatism in making sales at the prices freely offered by those buyers who have been in the market. The yards usually ask higher than the consumers generally will pay, and this has resulted in forcing up the offers of the latter in some cases. As an instance, one eastern Pennsylvania steel works which a week ago was offering only $10, delivered, for heavy melting steel, now will pay $10.50, delivered. Considerable steel is moving from the yards in this territory to eastern Pennsylvania, against $10.50 orders recently placed. There is some activity in wrought scrap. Offers of $8, New York, are being made by brokers and by some mills. It is reported

(*For complete prices see page* 440.)

that one lot of 2,000 tons was negotiated in this territory for New Jersey and eastern Pennsylvania delivery on about this basis. Some inquiry for car wheels is current.

Scrap Somewhat Higher

Chicago, Feb. 23.—Slightly better quotations are being made on iron and steel scrap in the Chicago district, following a recent increase in the price of bar iron and after considerable purchases of steel by a large local user. Part of the increase undoubtedly is due to speculative buying among brokers and it is understood a considerable tonnage has been contracted in this way. As a general proposition, consumers are not taking much steel and the heavy buying referred to will take this consumer out of the market for a considerable period. Only one railroad list is now actively before the trade, the C., B. & Q. railroad offering 4,500 tons.

Growing Better

Cincinnati, Feb. 23.—The feeling in the iron and steel scrap market is gradually growing more optimistic. Sales of steel scrap continue good, but dealers state that they are finding it a hard matter to dispose of cast scrap. Heavy melting steel continues to be the best seller in the market and is quoted at from $9 to $9.50 per gross ton. The large surplus available from the railroads and dealers' yards keeps prices from advancing, and they are quoted at the same level that has held here for several months.

Prices Recede.

St. Louis, Feb. 22.—The scrap market is still off, and prices have receded on several articles. Among these are re-rollers and heavy melting steel. Cast iron borings and machine shop turnings are very scarce and in demand, and prices have advanced on these commodities. Railroad lists out this week are: Chicago, Burlington & Quincy, 4,500 tons of scrap, including 500 tons of No. 1 railroad wrought and 400 tons of No. 2 railroad wrought.

Will Increase Size

Pittsburgh, Feb. 23.—By far the most important development in the tin plate trade this week is the official announcement that the McKeesport Tin Plate Co., operating 22 mills at McKeesport, Pa., will add 20 mills to its plant as soon as possible. When completed, the plant will be the largest single tin plate mill in the country. Tin plate mills, except those affected by trouble arising over the Amalgamated Association wage scale, are operating at capacity.

Bar Users Specifying

On Contracts Before Advance Takes Effect March 1—Very Little Buying

Philadelphia, Feb. 22.—Announcement by the makers that unspecified February quotos under old steel bar contracts will be cancelled March 1, and the advance to 1.15c, Pittsburgh, scheduled for the same date, have tended to stimulate specifications from buyers in this territory. The past week has been a good one for makers in this respect and next week is expected to be even better, since it is believed many buyers will not lose the opportunity to take in the low-priced tonnage under former contracts. Some nice lots of new business, principally in reinforcing bars, are in the market. The Boston Elevated Railway Co. asks 1,700 tons of deformed bars and a Lebanon buyer is out for 725 tons of rivet rods. The Broad street bridge, Philadelphia, which is being bid upon this week, will require 400 tons. The United Railways of Baltimore want a small lot. For export, an inquiry for 300 tons of rounds for bolt making and 75 tons of small angles for England remains in the market, as well as several other matters for foreign shipment. Prices on prompt steel bars remain 1.26c, Philadelphia, or 1.10c, Pittsburgh. On March 1, the advance to 1.31c, Philadelphia, for March delivery goes into effect.

Small Buying of Steel Bars

Chicago, Feb. 23.—With only a few days of February remaining the quotation of 1.29c, Chicago, on steel bars is practically out of the market. Delivery in February has passed as far as new business is concerned and such small tonnages as are being booked are now considered March delivery and take the March price of 1.34c, Chicago mill. As a matter of fact, the larger number of users of steel bars are well covered for first quarter and many through first half and only smaller buyers are interested in the market at present.

Bar Mills Fairly Busy

Pittsburgh, Feb. 23.—Manufacturers of steel bars this month have enjoyed a fairly heavy demand for material. Specifications from makers of drop forgings and shafting interests have been increasing in volume the last 30 days. Several mills and large machine shops, as indicated elsewhere in this issue of *The Iron Trade Review* are busy making shrapnel shells for belligerent nations. Steel bars are being firmly held at 1.10c for the remainder of the month, 1.15c for March and 1.20c for second quarter delivery.

Bar Iron Improves

Cleveland, Feb. 23.—Both the Union and the Empire rolling mills are in operation this week, as the demand for bar iron recently has improved and prices are more satisfactory in competition with the Chicago product, owing to the advance in quotations at Chicago. Steel bar specifications are satisfactory and the outlook is that the schedule of 1.15c for delivery in March and 1.20c for second quarter will be adhered to.

Iron Bars Are Firm

Chicago, Feb. 23.—Bar iron mills are shipping about the same tonnage as they are contracting and the accumulation now on mill books remains practically the same from week to week. Prices are firm at 1.10c, Chicago mill, and no maker appears ready to quote below this level. Numerous contracts offered on the basis of previous quotations have been turned down recently and the market seems to be firm at the new level.

Low Prices are Reported

Philadelphia, Feb. 23.—Sales of common bar iron have been made by some makers as low as 1c, eastern Pennsylvania mill, equivalent to 1.07c, Philadelphia, it is understood. Such quotations, however, have been confined to one or two mills, as most makers will not go above 1.05c, mill, on a desirable order and on ordinary lots ask from 1.10c to 1.15c, at the mill. The Philadelphia market at present appears to range from about 1.12c to 1.15c. Volume shows only slight expansion, generally, though some of the mills which have been naming low prices, have been running practically full.

The W. J. Burton Co., Detroit, has installed an entire side wall and ceiling of metal in a building at 36 Michigan avenue, that city, where a new restaurant has just been opened. The metal side wall is one of the sanitary and fireproof features of the restaurant.

The Pittsburgh Filter Co., Pittsburgh, has received an order for a 3,000,000-gallon mechanical filter plant for the Sedalia Water Co., Sedalia, Mo.

(*For complete prices see page* 440.)

Labor Troubles Are Threatened

As Result of Rejection of Proposed Reduction of Wages at Sheet and Tin Plate Mills—Some Plants Have Closed

Pittsburgh, Feb. 23.—Sheet and tin plate mills owned by a dozen central western manufacturers may be idle for a brief period as a result of the refusal of employes to accept reduced wage scales proposed by employers and recommended by officers of the Amalgamated Association. Reductions amounted to 11.2 per cent for sheet mill men and 6 per cent for tin mill employes. Several mills closed yesterday. Manufacturers conferred here last Friday, but made no official announcement about their meeting. The Amalgamated scale was signed by mill owners for the year ending June 30, next. The list includes the National Enameling & Stamping Co., Granite City, Ill.; the Youngstown Iron & Steel Co., Youngstown, O.; the Brier Hill Steel Co., Youngstown, O.; the Deforest Sheet & Tin Plate Co., Niles, O.; American Rolling Mill Co., Middletown, O.; the Newport Rolling Mill Co., Middletown, O.; the Whitaker-Glessner Co., Wheeling, W. Va.; Follansbee Bros., Pittsburgh; Griffiths Charcoal Iron Mills, Washington, Pa.; Trumbull Steel Co., Warren, O.; N. & G. Taylor Co., Philadelphia, and the Carnahan Tin Plate & Sheet Co., Canton, O. Men employed by three of the above concerns, the National Enameling & Stamping Co., the Youngstown Iron & Steel Co. and at one of the plants of the Whitaker-Glessner Co., voted to accept proposed cuts. The high price of spelter is causing makers of galvanized sheets to sell cautiously; no material is being offered at less than 3.25c for base size gage, so far as is known. Mills continue to operate about 60 per cent of capacity.

Export Inquiry for Sheets.

Philadelphia, Feb. 22.—Some inquiry for sheets has appeared in this market for England. One lot of 100 tons for Liverpool delivery is out. The eastern sheet market continues of a rather indifferent character and is neither good nor bad. The mills usually manage to get together enough specifications to operate fairly full, but new buying is listless and the market lacks tone. For No. 10 gage blue annealed 1.50c, Philadelphia, or 1.35c, Pittsburgh, is the going price.

Still Advancing

Cleveland, Feb. 23.—Sheet makers have again advanced their quotations on galvanized sheets, the new price being 3.40c, Pittsburgh or Youngstown, for No. 28 for immediate shipment, as compared with 3.25c a week ago. The controversy with the Amalgamated association as to wages in sheet and tin plate mills has not yet affected any Cleveland mills, although the Amalgamated officers claim that a lodge has been organized at one Cleveland plant which is not now in operation.

Advancing at Cincinnati

Cincinnati, Feb. 23.—New business in the sheet market is as good as could be expected considering the uncertainty of prices, especially those on galvanized sheets. Quotations are slowly advancing, galvanized sheets No. 28 gage being now quoted at 3.40c, Pittsburgh, and black sheets No. 28 gage at from 1.90c to 1.95c, Pittsburgh. Spelter is scarce, and at times is practically not attainable, and because of this rolling mills are accepting orders for immediate delivery only. Specifications on old orders are becoming better as prices advance.

Will Not Sell Galvanized

Chicago, Feb. 23.—Continued advances in the price of spelter have caused sheet makers in this territory to withdraw from the market inasmuch as spelter is practically unobtainable. The market is nominally 3.59c, Chicago mill, but almost without exception makers refuse to quote on inquiries and will not obligate themselves under any circumstances.

For some time, sheet makers have insisted that whatever galvanized sheets they sell are taken with the distinct understanding that former trade customs are not to be regarded and that sheets bought are to be taken without fail by the purchasers at the price named in the contract. No protection against decline in the market is given and for the most part users are advised to buy only for their absolute needs in view of the uncertainty of the spelter market.

Black and blue annealed sheets are unchanged and demand is small.

Warehouse Business Better

Chicago, Feb. 23.—Warehouse business continues to improve and the volume at present is better than it has been since the first of the year. The galvanized sheet situation is reflected in the warehouse trade and an advance on No. 28 gage from 3.60c to 3.75c has just been made. This figure is not as much of an advance over former quotations as is the present mill figure over that prevailing before the spectacular advance in spelter commenced.

(*For complete prices see page* 440.)

Wire Market

Specifications Stimulated by Recent Price Advances

New York, Feb. 23.—There has been some talk that the present differential of 40 cents between plain and galvanized wire products will be raised on account of the advance in spelter. No decision on this matter, however, yet has been reached. Some time ago this differential was advanced from 30 to 40 cents. Favorable activity continues in the wire market, especially in shipments. Specifications of the leading interest in February have averaged close to 6,500 tons daily. The export tonnage has been running heavy recently. Only a relatively small part of this has been in barb wire or in products apparently for army needs.

Wire Fairly Active

Pittsburgh, Feb. 23.—Specifications against contracts for wire products have been coming out at a fairly satisfactory rate this year. Recent price advances stimulated activity, although they failed to develop any new buying of consequence. Jobbers throughout the country advise that prospects for a more active spring are bright. Belligerent nations continue to figure in the American market for wire nails and barb wire, although sales are not so heavy as they were 30 or 60 days ago. An order for 2,000 tons of barb wire, for shipment to England, was placed in this district a few days ago.

Prices are Firm

Buffalo, Feb. 23.—Prices are holding firmly at the advanced schedule recently announced. The interests here report a general improvement in the situation with a slight amount of inquiry being noted. Specifications also show an improvement over a week ago.

Dull at Buffalo

Buffalo, Feb. 23.—The past week has been quiet. The leading local user is out of the market on heavy melting steel—has sufficient ahead for some time to come. Prices remain the same as quoted a week ago.

Two More Boats Placed

Plates Expected to Go to Eastern Makers—Other Ship Building Work is Pending—Prices Firmer

Philadelphia, Feb. 22.—Orders for two more large-sized merchant boats and for a miscellaneous assortment of other marine craft were placed with Atlantic ship yards the past week. These raise to 18 the number of freight and passenger ships placed with eastern builders since Dec. 1. The Harlan & Hollingsworth Corporation has received a second tank steamer for the Anglo-Saxon Petroleum Co., a British company requiring 2,600 tons of plates and 1,000 to 1,500 tons of shapes. The plates are expected to go to eastern makers. The same yard has taken a ferry boat for the Fort Lee Ferry Co., New York, requiring about 600 tons of plates and shapes and is expected to receive the contract for a vessel for the Baltimore, Chesapeake & Atlantic Steamship Co., running 1,000 to 2,000 tons. The New York Shipbuilding Co. has received an additional freight steamship from the Coastwise Transportation Co., making three in all placed recently. The Carnegie Steel Co. will furnish about 5,000 tons of plates and shapes for these three boats. The Wm. Cramp & Sons Ship & Engine Building Co. has been awarded three large steel barges for the Isthmian Canal Commission. Each will require 1,500 tons of plates and about 750 tons of shapes. Other shipbuilding work is being bid upon in the east and the market is very active. Plate mill operations in eastern Pennsylvania are increasing though slowly. The tonnage continues to come from many sources with railroad orders slack. One eastern Pennsylvania mill ran at 70 per cent of capacity last week and entered orders at an even higher rate. Other eastern mills are not doing quite so well. R. B. Nubold & Son Co., Norristown, have the contract for pier shields at Atlantic City and the 200 tons of plates will go to the Carnegie Steel Co. Prices for February plates are quite staple at 1.25c, Philadelphia, or 1.10c, Pittsburgh. There is not very much forward buying on which advances are being quoted.

Bids on Battleship Plates

New York, Feb. 23.—The Worth Bros. Co., which, as reported last week, is the low bidder on 12,730 tons of ordinary quality plates for the battleship California, quoted on this business, 1.357c, delivered, to the Brooklyn navy yard, equivalent to about 1.19c, Pittsburgh, under the advanced freight rate from Pittsburgh of 16.9c for 100 pounds, now in effect. On 400 tons of high tensile plates, this same mill is low at 1.945c, delivered. The bid of the Carbon Steel Co., which was lowest on 1,700 tons of nickel steel plates was 4.66c, delivered. This material is to be delivered over a period of 18 months from the date of the contract. Plate business in this territory is a little better in a miscellaneous way, but apart from one good-sized lot for the third tracking of the Broadway elevated line in Brooklyn, now in the market, inquiries usually are small. Prompt plates now are quoted 1.269c, New York, or 1.10c, Pittsburgh, in view of the 5 per cent advance in the freight rates effective Feb. 23. After March 1 prices are $1 higher.

Carnegie Drives Plate Mills

Pittsburgh, Feb. 23. — Generally speaking, plate mills in the Greater Pittsburgh district are operating at about 60 per cent of capacity, although there are some exceptions. The Carnegie Steel Co. is driving plate mills at approximately 93 per cent capacity, to supply plates for the National Tube Co., which, as previously announced, recently took several attractive orders for steel pipe for shipment to the southwestern oil fields. Demand for material is described as general, but disappointment is expressed because the railroads are not figuring in the market. Material involved in cars ordered the early part of the year is not moving as rapidly as desired. Plates are being held at 1.10c for the remainder of this month; 1.15c for March and 1.20c for second quarter shipment, but demand for second quarter material has not been sufficient to offer much of a line on the situation. Material has been offered in an isolated instance for second quarter delivery at slightly less than the generally prevailing quotation.

Plates for Valparaiso

Cleveland, Feb. 23.—The plate market is more active and buyers are insistent upon prompt deliveries. The Cleveland Steel Co. and the Lakeside plant of the Otis Steel Co. are working full time. On ordinary business, 1.15c, Pittsburgh, is the lowest quotation, but 1.10c has been quoted for prompt delivery on especially desirable business. An unusual sale by a Cleveland jobber was 50 tons of plates for shipment to Valparaiso. This tonnage was negotiated through a London merchant and it is evident that the buyer in Valparaiso could not obtain the plates from English mills. On an inquiry of considerable size, delivery extending through first half, leading mills quoted 1.20c, Pittsburgh.

Plates Still Weak

Chicago, Feb. 23.—Continued weakness is the feature in the steel plate market and although quotations are holding fairly firm, business in plates is much less than in shapes and bars, with a greater tendency to price concessions. Comparative absence of car buying is responsible for much of this weakness and the tonnage of plates is so small that mills are operating only on part time. While 1.29c, Chicago, is still available for immediate delivery mills are attempting to put into force the advanced quotation of 1.34c, Chicago, for March delivery. However, the volume of demand for plates is so small there is not much incentive to shade the quotation.

(*For complete prices see page* 440.)

Billet Prices

Show Wide Spread in the Youngstown District

Pittsburgh, Feb. 23.—Minimum quotations continue to prevail in the Youngstown district for semi-finished steel products, it being reliably reported sheet bars are being offered at $19 for shipment the remainder of the quarter. Billets are considered relatively stronger than sheet bars in the valleys, but there has not been enough activity to test the market. Muck bar is decidedly quiet. No trace of important sales can be found. The market is nominally quoted at a spread from $27 to $28, Pittsburgh. Wire rods are quotable at a range from $25 to $26, Pittsburgh.

Quiet Sales Suggest Cutting.

Philadelphia, Feb. 22.—The semi-finished steel market in eastern Pennsylvania and surrounding districts on the surface continues slow. Occasionally a good-sized order is put through quietly, which gives the inference that an attractive price is quoted. There have been several such instances recently. A large central western maker has been tempting eastern buyers with some lower prices. A Cumberland, Md., tin plate maker who considered the purchase of 500 to 1,000 tons of early sheet bars has decided not to buy. A Lebanon, Pa., buyer inquiring for 725 tons of rivet rods will probably take wire rods. Billets for re-rolling are quoted at $21.40, Philadelphia, or $19, Pittsburgh.

More Promising Prospect

For Structural Contracts, But Awards Are Not Numerous for Large Tonnages

New York, Feb. 23.—Prospects for structural work to come out later remain more promising in the metropolitan district, but current awards still reach only a small total. Plans are expected to be out in a few weeks for the Printing Crafts building, at Eighth avenue, Thirty-third and Thirty-fourth streets, this city, which will run 8,000 tons. The Brokaw building, on Broadway near Forty-second street, 2,000 tons, is another project which is assured of being up for bids in a few days. Eastern shapemakers have had before them the past week an inquiry for 7,000 tons of girders and trusses for bridge work on the Pacific coast. Another inquiry received by eastern shops calls for a bridge of five spans, each 125 feet long, for Siam, about 500 tons. Structural shapes now are quoted for immediate delivery at 1.269c, New York, for carloads, and 1.301c, on less than carloads, equivalent to 1.10c, Pittsburgh base, on carloads. It is indicated that certain eastern mills will shade this figure on a desirable tonnage.

Structural Prospects Improving.

Philadelphia, Feb. 23. — Betterment in the structural situation in Philadelphia and adjacent territory consists chiefly in prospective work. It is learned that some attractive building enterprises are in the hands of the architects in Philadelphia and Baltimore and are expected to come out soon. The number of new inquiries offered in this territory is larger, but the total tonnage is inconsequential, because many of the jobs are small. The Pennsylvania railroad this week put out inquiries for three more small bridges and apparently now is going ahead in bringing out individually the projects included in the proposed 1915 bridge budget which recently was bid upon but was withdrawn. Prompt structural shapes continue commonly quoted at 1.25c, Philadelphia, or 1.10c, Pittsburgh, but it is believed this could be shaded on a desirable quantity with some of the nearby mills.

Fabricators Want Advances

Pittsburgh, Feb. 23.—Fabricators in the Greater Pittsburgh district are exerting every possible influence to maintain prevailing quotations, in an effort to get away from the unremunerative quotations that have prevailed recently. Some erectors are refusing to quote on material, apparently content to await developments. Several small contracts were placed this week.

Structural Demand Light

Chicago, Feb. 23.—Unsettled conditions in labor organizations in Chicago have held back somewhat plans for structural work in Chicago, but the situation seems to be clearing and the Building Construction Employers' Association is signing up agreements with most of the unions involved in the building trades and such progress has been made as indicates an entire agreement by April 1. The Building Trades Council has ratified a uniform form of agreement applying to arbitration, the closed shop and similar factors. The endeavor is being made by both organizations to eliminate the dishonest business agent by making it impossible for him to call a strike for private reasons.

Contracts closed in the west recently make up a total of about 1,500 tons, which have been awarded the smaller interests represented close to the point of where the work is to be done.

CONTRACTS AWARDED.

Messrs. Miller & Paine Co., Department store, Lincoln, Nebraska, 793 tons, to Omaha Structural Steel Co.

S. S. Kresge Co. business building, Kansas City, Mo., 248 tons, to Kansas City Structural Steel Co.

Coal handling plant, Manitowoc, Wis., owner unknown, 200 tons, to Worden-Allen Co.

Railway Ice Co., ice plant, Memphis, Tenn., 160 tons, Virginia Bridge & Iron Co.

Addition to plant of the Hockingsmith Wheel & Mine Car Co., Penn Station, Pa., 100 tons, awarded to Riter-Conley Mfg. Co.

Extension to plant of Kennedy-Stroh Corporation, Oakmont, Pa., 225 tons, awarded Memphis Steel Construction Co.

Elevated steel tank for city of Corpus Christi, Tex., 125 tons, awarded Memphis Steel Construction Co.

Apartment for Jacob Axlerod, Riverside drive, New York City, 500 tons, awarded Passaic Structural Steel Co.

Y. M. C. A. building in the Bronx, 500 tons, awarded Hay Foundry & Iron Works.

CONTRACTS PENDING.

Hamilton county court house, Cincinnati, O., 2,900 tons, Chas. McCall & Co., Philadelphia, low bidders on the general contract.

Three bridges for the Pennsylvania railroad, one at California, Pa., one at a Monongahela river point and the other on the Delaware division, below Wilmington, 700 tons, bids being taken.

Building for Logan-Gregg Co., Pittsburgh, 1,200 tons; bids closed Feb. 23.

Store building for Brokaw Bros., Broadway near Forty-second street, New York City, 2,000 tons, preliminaries arranged and bids about to be asked.

Wheelock loft building, 38 East Thirty-third street, New York City, 1,200 tons, revised bids being taken.

Pier at Forty-seventh street and Hudson river, New York City, for City of New York; 300 tons of beam work, bids to be taken March 1.

(*For complete prices see page* 440.)

Cast Pipe

Not in as Active Demand in Eastern Territory

New York, Feb. 23.—A falling-off in the buying of cast iron pipe from the brisk activity that recently prevailed now more generally is observable in eastern territory. Inquiries are quite numerous, but invariably are of small size. Private buyers including the water and gas companies in this territory seem to have placed the major portion of the business they intend to release at this time. The eastern pipe foundries, however, as a rule, have good bookings and their operations continue heavier. Prices are more stationary and are holding fairly well some recent slight improvement. R. D. Wood & Co. finally have received the 2,300 tons for Hawthorne, N. J. This same buyer is low bidder at $22.70, delivered, on 225 tons of 6 to 8's for Schenectady, N. Y. If shipment is taken in March, the pipe is offered at $22.20, delivered. The 310 tons of 4 to 8's for the Beverly Gas & Electric Co., Beverly, Mass., also has gone to R. D. Wood & Co. The 360 tons of 4 to 12's for Lewiston, Me., delivery has been disposed of. No action has been taken on the 860 tons of 8 to 20's for the Portland Gas Light Co., Portland, Me. The Rockland Gas Light Co., Rockland, Me., is inquiring for 400 tons. Minneapolis will take bids Feb. 25 on 2,526 tons of 6 to 16's and Toledo on the same date for 1,500 tons of 6 to 12's. Ft. Wayne, Ind., wants 300 tons of 6 to 12's for March 2. Akron, O., wants 2,520 tons of 4 to 10's for March 5.

Pipe Makers Busy

Chicago, Feb. 23.—Cities continue to ask bids for their requirements for water pipe during the present year and considerable tonnages are being closed in all parts of the country. Bay City, Mich., has awarded 527 tons to the Glamorgan Pipe Co., and Rockford, Ill., 500 tons to the American Cast Iron Pipe Co. Bids will be opened at Minneapolis, Feb. 25, on 2,500 tons; at Akron, O., March 5, on 2,500 tons, and at Duluth, Minn., March 4, on 1,200 tons.

W. P. Snyder, president of W. P. Snyder & Co., Pittsburgh, is enjoying a few weeks at Palm Beach, Fla.

English See the Humor

Of the German Position—Birmingham Never So Prosperous—Exports Sharply Decline

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 19.

The amazing threat of Germany to torpedo neutral vessels has brought America very much into the limelight. The sympathetic references from across the Atlantic have been greatly appreciated here. On this side, we feel the humor of the situation, and hardly take seriously the threat of an enemy which dare not show a warship in British waters. Apparently, this is a little more window-dressing to prevent the German people from being too downhearted. While the military situation shows little change, the economic and industrial position continues very gratifying, and, apparently, is improving. The board of trade returns for January, issued yesterday, show a reduction in imports of only 1 per cent as compared with a year ago; though there is a large fall in exports. The latter is due largely, of course, to the temporary suspension of the export of capital and partly also to the fact that the enormous quantities of war material shipped abroad do not figure in the official returns. Some of our industries have no time to apply themselves to pacific business, even if it were available. At the same time, we recognize that the partially suspended buying of the colonies and South America has affected our business, especially in the matter of iron and steel. It was to be expected, of course, that exports of iron and steel would show a considerable falling off, if only from the small shipments of pig iron to Japan and the United States as well as to the continent, while railroad material to various countries, galvanized sheets to India, and tinned plates to most destinations are necessarily appreciably curtailed.

The war has brought marvellous prosperity to certain trades and cities. Birmingham, in fact, never has been so prosperous. This is shown by the lavish spending of the working classes, by the increased sales of workmen's tickets, the unprecedented number of advertisements for workers of all kinds, and in other details. Unemployment is practically non-existent here, and even the jewelry trade is reviving. Everyone who is in any way suffering from the war is being adequately dealt with.

The buying movement, in regard to pig iron, has apparently very nearly spent itself, and, wherever possible, bargains are being postponed. This disposition has been strengthened by the prevalence, for the past week, of slightly easier conditions in Cleveland. There was a fall of 2d (4c) during the week ending Wednesday. But today (Friday) this has been recovered, and it is just possible there may be another upward movement. Sellers are putting their customers off wherever possible, partly because they dislike long commitments in the present state of affairs, and also on account of the enormous difficulty of production. Iron ore has doubled in price during the last six months, and some fuel has increased pro rata. This would not matter so much if the material could be got with reasonable regularity, but this is very far from being the case. Furnaces are dependent almost entirely on daily supplies, and, in all cases, they have had to cut down production, often by going on slack blast. The fuel question has become serious.

The hematites are very much as they were and are practically about 95s ($22.80).

Finished Iron and Steel

The finished market continues decidedly animated. Interest still centers in the iron department on marked or best bars. Everybody was confident a week ago that these would be put up to 10s ($2.40) making the standard £9 10 ($45.60). But the knowing ones have been disappointed. Makers are quite content for the present, although it is a long time since a margin of only 15s ($3.60) divided best and common iron. The truth seems to be that the makers of best iron have not had any very great run of orders, and they are not under any temptation, therefore, to inflate prices. Probably they will be heard from soon. Common iron continues to rise in value, some makers having booked as high as £8 10s ($40.80). Other descriptions have advanced in proportion, hoops now booking at £8 ($38.40). There is a great demand for steel scrap and large contracts have been taken on. In the galvanized sheet department, the very high price of spelter, £41 ($196.80) is forcing the hands of makers of sheets who have a minimum of £13 ($62.40) for export, and £13 10s ($64.80) for home business, but the volume of business is moderate.

For high carbon billets, while £7 10s ($36) is the standard, buyers readily offer £8 ($38.40) even for delivery after June. The mills for finished steel are very full of work.

The position with regard to half-finished steel is very interesting just now. Makers of wire are very much wanting wire rods. At present wire prices are £11 ($52.80), but it is confidently prophesied that the selling figure shortly will be £13 ($62.40) or £14 ($67.20).

Objection

To Confirmation of Some of President's Nominees

Washington, Feb. 23.—Republican senators are complaining that their party was entirely ignored by President Wilson in the list of names he sent to the senate yesterday as members of the federal trade commission. It consists of three Democrats and William H. Parry, Seattle, Wash., Progressive Republican, editor of *The Seattle Post-Intelligencer* and treasurer of the chamber of commerce, of that city, and George Rublee, Progressive, Cornish, N. H., formerly a practicing lawyer and a member of the special committee on trust legislation of the Chamber of Commerce of the United States. There are some Republicans, however, who are not opposed to Mr. Parry, among them being mentioned Senator Jones, of Washington. Senator Reed, Democrat, is understood to be prepared to renew a criticism he made some time ago of Mr. Rublee. Senator Gallinger, Republican, is also understood to be opposed to Mr. Rublee. The other three nominees, all Democrats, are Joseph E. Davies, Madison, Wis., now commissioner of corporations; Edward N. Hurley, Chicago, president of the Illinois Manufacturers' Association, and William J. Harris, of Georgia, director of the census. The names are being considered by the senate committee on interstate commerce. It appears to be the plan to make Mr. Davies chairman of the commission.

There may be objection made against Mr. Hurley by the more radical element in the senate because of his business interests. Mr. Hurley at one time was manager of the United States Metallic Packing Co., and was active in developing the pneumatic tool industry in the United States and Europe. Mr. Harris was formerly engaged in the insurance and banking business. Mr. Parry is credited with a wide business experience and is, in addition to being a newspaper man, manager of the shipbuilding plant which constructed the battleship Nebraska. Mr. Rublee is an attorney and economist.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

H. A. Cochrane has been appointed traffic manager of the A. M. Byers Co., Pittsburgh.

Herman Brill and Edw. P. Rawle have been elected directors of the J. G. Brill Co., Philadelphia.

J. M. Jones, general manager of the Massillon Rolling Mill Co., Massillon, has been elected vice president of the company.

Alfred C. Nelson, consulting and contracting engineer, has opened offices at 418 Rockefeller building, Cleveland.

Frank L. Sessions, consulting electrical and mechanical engineer, now has his offices in the Rockefeller building, Cleveland.

M. F. Findley is in charge of a recently opened sales office at Detroit by the West Leechburg Steel Co., Pittsburgh, manufacturer of cold strip steel.

William M. Starrett has returned from the Isthmus of Panama, where he had been in charge of construction work for the McClintic-Marshall Co., Pittsburgh.

John D. Miller, formerly connected with the Wheeling Mold & Foundry Co., Wheeling, W. Va., has been made general manager of the Edward Maher's Sons Co., Newark, N. J.

C. P. Fay, of the Stevens Arms & Tool Co., Springfield, Mass., has been elected vice president of the Page-Storms Drop Forge Co., of that city, to succeeded E. C. Page, deceased.

Edw. T. Stotesbury has been elected chairman of the Reading Iron Co., Reading, Pa., to succeed the late Geo. F. Baer. Jefferson Snyder has been made a director of the same company.

Samuel Powers Connor, formerly with the Geo. A. Fuller Co., has assumed the management of the New York office at 25 East Twenty-sixth street, of Cramp & Co., Philadelphia, general contractors.

Ferdinand W. Roebling, treasurer of the John A. Roebling's Sons Co., Trenton, N. J., has contributed $20,000 to the Union Industrial Home in that city. He recently gave a similar sum to St. Francis hospital.

William H. Hart, 80, president of the Stanley works, New Britain, Ct., who has held executive offices with it for 60 years, has resigned and accepted a new office, that of chairman of the board of directors. He is succeeded by his son, George P. Hart, who was vice president of the corporation for 12 or 15 years.

J. R. McWane, vice president of the American Cast Iron Pipe Co., of Birmingham, Ala., has been elected president of the company, succeeding J. J. Eagan, who has been made chairman of the board, a newly-created position.

Henry C. Dexter, Providence, R. I., president of the Southern New England Textile club, formerly treasurer of the Greene & Daniels Co., Pawtuckett, R. I., is now associated with the Fales & Jenks Machine Co., Pawtucket, R. I.

Henry H. Knapp, office manager of the Reed-Prentice Co., Worcester, Mass., machine tool manufacturer, has been elected assistant treasurer of the company, a new office created at the annual meeting, Feb. 9, at which the former officers were re-elected.

Virgil G. Marani, former building commissioner of Cleveland, and J. E. A. Moore, until recently chief engineer of the C. O. Bartlett-Snow Co., Cleveland, have formed a partnership as civil and mechanical engineers with offices at 1900 Euclid building, Cleveland.

Walter L. Clark, formerly vice president of the Niles-Bement-Pond Co., has joined the organization headed by E. R. Stettinius, which has been formed through J. P. Morgan & Co., to make purchases of various supplies in this country for the British government.

Wharton Whittaker, for several years sales manager of the Rhode Island Tool & Machine Co., Providence, R. I., has been elected vice president and general manager of the William H. Haskell Co., manufacturer of bolts, nuts and textile specialties, Pawtucket, R. I.

A. J. Kieskhefer has been made a director of the National Enameling & Stamping Co., succeeding A. M. Steinhardt, resigned. The other directors were re-elected. Geo. V. Hagerty has been elected treasurer and Samuel D. Roberts assistant secretary and treasurer. The other officers were re-elected.

James M. Dayton, who has been in charge of designing and manufacturing of Eagle marine engines and National Sweeper Co.'s products at the Standard Co.'s plant, in Torrington, Ct., has been appointed superintendent of the Apple Electric Co., Newark, N. J., affiliated with the Splitdorf Electric Co.

President and General Manager C. L. Holman and all other officers of the Laclede Gas Light Co., of St. Louis, were re-elected at the annual meeting of directors, Feb. 17. The other officers are: G. H. Walker, vice president; W. H. Whitton, secretary-treasurer; W. S. Dodd, assistant treasurer. The old directors also were re-elected.

G. W. Doty, formerly connected with the C. E. Mills Oil Co., and the United States Graphite Co. is now identified with the J. S. McCormick Co., Pittsburgh, dealer in core oil, core compounds and general foundry supplies. Mr. Doty is well known in the foundry trade. The McCormick company recently moved into a new office building on Twenty-fifth street.

C. M. Schwab, president of the Bethlehem Steel Corporation, was accorded a surprise party by the leading officials of the company and their wives at his residence on Riverside drive, New York City, Friday evening, Feb. 19. The affair was to commemorate Mr. Schwab's 53rd birthday, which takes place April 18. The guests came to New York from South Bethlehem by special train.

Frederic H. Fay, consulting engineer, Boston, will read a paper on the "Protection of Metal Structures," before the structural section of the Engineers Society of Western Pennsylvania, March 2. William H. Burr, professor of civil engineering, Columbia University, will tell about "The Relation of Educational Training to Engineering Practice," at the regular monthly meeting of the society, March 16.

Edward R. Stettinius, president of the Diamond Match Co., it is announced, has taken charge of the department of the banking firm of J. P. Morgan & Co., which is to purchase supplies for the British government in this country. J. P. Morgan & Co. recently were appointed commercial agents for Great Britain for buying war and other supplies in the United States. Mr. Stettinius has taken a three-months' leave of absence from his company and will have his headquarters in the Morgan Bank building, Board and Wall streets, New York City.

Some Interesting Results

Obtained by Trial Rolling of Rails for Pennsy—Russia Inquires for 6,000 Kegs of Spikes—Few Equipment Orders

New York, Feb. 23.—Railmakers now are completing the comparative rollings of 1,000 tons under each of the old and new specifications of the Pennsylvania railroad. Some interesting results have been obtained, it is understood, but full official examination of these has not yet been made. Some of the mills have not yet completed their trial rolling and until all the facts are in hand, no announcement of the findings from the tests will be made nor action taken on the remaining 160,000 tons of the Pennsylvania rail order. The new specifications, it will be recalled, provide that the bloom shall be allowed to cool to atmosphere temperature and then reheated before being put through the final passes to form the rail.

Rail orders during the past week have run to small amounts. The New York, Philadelphia & Norfolk railroad has placed 2,300 tons with the Pennsylvania Steel Co.; the Public Service Corporation, of New Jersey, 1,500 tons of girder rails with the Lorain Steel Co., and 1,000 tons with the Pennsylvania Steel Co., in addition to 1,300 tons of tee rails placed with the Bethlehem Steel Co., as previously reported. The Soo line practically has closed for 8,000 tons with the Illinois Steel Co. A sale of 1,000 tons of manganese rails has been made to an eastern road. The Virginian railway is inquiring for 3,300 tons and the Maine Central lot of 8,500 tons still is under negotiation.

Russia has out an inquiry for 6,000 kegs of standard railroad spikes. The United Railways of Baltimore has placed 850 kegs with eastern makers and the Norfolk & Southern wants 250 kegs.

Equipment orders still are few. The recent steel coach order of the Reading calls for 25 instead of 15, as previously stated. Of these, 15 went to the Pullman Co. and 10 to the Harlan & Hollingsworth Corporation.

Niles-Bement-Pond Co. Changes

R. C. McKinney, for many years president of the Niles-Bement-Pond Co., New York, tendered his resignation of this office at the annual meeting of the company on Feb. 3. The new president is J. K. Cullen, long a vice president of the Niles-Bement-Pond Co., and president of the Niles Tool Works Co., Niles, O., before it was taken over by the former interest. Mr. McKinney's resignation was due to his desire on account of ill health, to relinquish some of his responsibilities; he will continue active, however, in the company's affairs, having been elected chairman of the board of directors, an office which for several years had been vacant. Another important change was the resignation of W. L. Clark, a vice president. Mr. Clark retired to become connected with J. P. Morgan & Co.; he will act as assistant to Edward R. Stettinius, president of the Diamond Match Co., who recently was appointed head of the new purchasing department which the banking house inaugurated on its appointment as commercial agent of Great Britain in this country. The other officers of the Niles-Bement-Pond Co., were reelected and the personnel now is as follows: President, J. K. Cullen; vice presidents, A. C. Stebbins and T. T. Gaff; treasurer, C. L. Cornell; secretary, F. Ingalls; assistant treasurer, J. B. Cornell.

METAL MARKETS

New York

Feb. 23.

Large sales of prime western spelter have been made to the big galvanizing interests, and especially to the Steel Corporation, during the past week, and several good sized tonnages continue under negotiation. Most of this business is for delivery over May and June and some for beyond. On May and June, it is understood, around 8.50c, St. Louis, was paid. The market continues quite barren of transactions in spot and nearby, due to the extreme scarcity in these positions. Spot and February are quoted nominally at 9c to 9.25c, St. Louis, March at 9c, St. Louis, and April at 8.85c to 8.90c, St. Louis. Brass special, in the absence of business, is considered as being around 10.50c to 11c, St. Louis, for futures; practically all the producers appear to be sold up to May. The price of sheet zinc has been advanced to 12.50c, f. o. b. Illinois mills, less the usual discount of 8 per cent on carload lots.

The tin trade has been kept in a state of mystification by the behavior of the London market recently. Today, spot standard closed in London at £180, compared with £186 yesterday and £184 Friday; standard futures closed at £159, compared with £164 yesterday and £161 Friday; Spot Straits closed at £181, compared with £189 yesterday and £185 Friday. The declines brought out a big inquiry here today but little business was booked due to the scarcity of sellers. Prices did not decline much here today, due to the continued shyness of sellers recently, as well as to the fact that for some time the market here has been below the cost of importing. Spot is quoted nominally at 39.25c, March at 38.25c, April at 37.25c, May at 36c and June and July at 35.50c.

Demand for lead is active and considerable business is being booked, mostly for domestic consumers, but considerable for shipment abroad. The outside market expects an advance by the leading interest, which now is quoting 3.85c, New York, and 3.77½c, St. Louis. Outsiders are quoting 3.75c to 3.80c, St. Louis, equivalent to 3.90c to 3.95c, New York, and as a rule name prices only for immediate acceptance.

Coke Output

Increased in Connellsville Region—Market is Dull

Pittsburgh, Feb. 23.—The Connellsville coke market is decidedly dull, so far as new sales are concerned. Operations in the upper and lower Connellsville regions have been gradually increased this year to meet increased requirements of blast furnace plants, but consumers have not had to enter the open market for additional fuel. Prices are unchanged. The foundry coke market shows no snap. Seventy-two hour coke continues to sell at a wide range in price. The *Connellsville Courier*, for the week ending Feb. 13, says production was 250,855 tons, an increase of 4,497 compared with the week before.

Coke Lifeless

Cincinnati, Feb. 23.—The southern coke market remains lifeless with new sales and inquiries at a minimum on both furnace and foundry grades. Dealers are selling but a few carloads each week of foundry coke, and there is no demand for furnace coke in this vicinity. Operators in the Pocahontas and New River districts are keeping only enough ovens in blast to supply contracts and are selling coal direct rather than turn it into coke and store it. Quotations are unchanged on all grades of southern coke.

Little Business

St. Louis, Feb. 22.—Nothing has transpired within the week to better coke conditions. No sales or orders, beyond car lots, have been reported, and there is little inquiry. Connellsville and Virginia 72-hour foundry grades are offered at $2.25, and 48-hour furnace grades at $2 to $2.25, all f. o. b., ovens.

Court Orders Repairs

Pittsburgh, Feb. 24. (By wire.)—The United States district court at Pittsburgh has ordered receivers for the United Coal Co. to make a contract with the Pressed Steel Car Co. to repair 1,000 coal cars belonging to that company. Repairs will cost about $8,000 a month.

Money and Iron: Fact, Comment

Car Company Points Way to Business Failure

And Urges Co-Operation—Report of Pressed Steel Car Co. Shows Greatly Reduced Earnings —New Low Record for Sterling Exchange—Is Money Being Shipped to United States for Safe Keeping?

"Co-operation points to business success, cut-throat competition leads to business failure," says the Pressed Steel Car Co.'s report for the fiscal year ending Dec. 31, 1914.

The report is a very unfavorable one, as net earnings, after repairs and renewals,. were only $892,352, compared with $2,734,816 in the preceding year. The sales, however, were in excess of those of 1911, 1909, 1908 and 1904. After reservation of $875,000 for preferred dividends, a balance remained of $17,352, equal to 0.14 per cent on the $12,500,000 common stock, compared with $1,319,816, or 10.55 per cent, the preceding year. It is the custom of the company to declare dividends in January for the year in advance out of the earnings of the previous year. Hence the action of directors in suspending payment of common dividends for this year is easily understood. Last year dividends of 3 per cent on common were paid. No change has been made in the preferred dividend of 7 per cent.

The business outlook and the federal trade commission law are discussed in a very interesting manner as follows:

"Less than 70,000 cars were ordered during the year from all the car manufacturers, and of this number only 1,705 freight and 308 passenger cars were placed between August 1 and December 31. Your company secured its proportion of the orders placed during the year, but ended the year with less freight car orders on the books than any year in its history. The passenger car department ran with a good amount of business during the year and has orders booked well into 1915, and the prospects are good for continued full operation.

"With conditions as they are the world over, it is difficult to forecast for the year 1915, other than to say that for the past nine years the railroads of the country have ordered less than half of their average annual requirements of new cars, which are estimated at 250,000 cars. With the large surplus and the poor demand for existing equipment, there has been no incentive to the railroads either to buy new cars or to put bad order equipment in good repair, and unless general business improves or the large trunk lines undertake to fill what are known as vacant numbers, the outlook is not promising. The letting of such contracts at this time might be warranted by the substantial direct tonnages such orders would bring to them in freight, as figuring from the raw material to the finished product there may be said to be represented from 50 to 60 gross tons of freight in each new car thus built, or the equivalent of $80 to $100 per car in additional freight receipts, which would materially increase the railroads' income and at the same time give an impetus to business, but it looks as though it will only be when there is a general revival in business that the railroads will feel warranted in increasing their expenses by repairs and renewals to old equipment or investing in new equipment.

Regulation of Business

"The administration has announced the completion of its program for the regulation of business by the passing of the federal trade commission bill. This bill declares that unfair methods of competition in commerce are unlawful. Therefore it will be part of the business of the commission in future to see that there is no unfair competition in commerce. Many people are of the opinion that all competition is fair, but a serious consideration of this subject will show the fallacy of this proposition. The public loses as well by unfair buying as by unfair competition. There is a probability that this evil will be eliminated by the operation of this bill.

"Managers of manufacturing companies have heretofore refrained from discussing with those in the same business, means and methods for the economic production and distribution of product, fearful of violating some law, written or unwritten. We hope the commission, when applied to, will give rulings on any question of this nature as to which manufacturers are in doubt. Such an attitude would be a great blessing to business generally. If the commission besides will encourage the formation and development of commercial organizations of various trades to the end that such organizations, obtaining from their members exact information as to the best methods of manufacture, sale and distribution of product, will be able in co-operation with the commission to furnish the information of the needs of the country, such a result will best bring about a decided stimulus to business. The practice of commercial organizations keeping trade commissions in touch with the business of the particular kind covered by such organization is satisfactorily employed in some foreign countries, and in these countries where commercial organizations are operated in full accord with the trade commission, this co-operation has brought about fairer wages to employes; more stability in a reasonable return on the capital invested; greater efficiency in manufacturing enterprises, and has distinctly benefited the consumer."

Income Account

	1914.	1913.
Gross sales	$13,375,090	$30,967,359
Gross earnings	1,104,396	2,768,458
Repairs and renew.	212,054	393,642
Net earnings	$892,352	$2,734,816
Depreciation	.....	180,000
Balance	$892,352	$2,194,816
Pfd. divs.	875,000	875,000
Balance	$ 17,352	$1,319,816
Common divs.	.....	375,000
Net surplus	$ 17,352	$ 944,816
Prev. surplus	8,405,000	7,460,184
	$8,422,352	$8,405,000

Sales and Earnings

Gross sales and net earnings of the Pressed Steel Car Co. for the past 13 years compare as follows:

	Gross sales.	Net earn'gs.
1914	$13,375,090	$ 892,352
1913	30,967,359	2,374,816
1912	19,019,403	970,343
1911	11,331,064	892,836
1910	27,975,978	1,848,366
1909	10,346,816	*1,954,583
1908	8,589,422	265,477
1907	36,443,304	2,907,920
1906	36,158,586	3,381,884
1905	19,357,827	1,106,901
1904	4,498,268	†707,111
1903	33,833,519	4,578,114
1902	23,032,491	1,927,925

†Loss.

*Includes sale of $1,200 cash received from sale of Canada Car Co. common stock which had no value placed upon it on company's books.

The Gold Situation

The unprecedentedly low rate of sterling exchange has been a matter of lively discussion in financial circles. The rate of $4.79, which was reached last Tuesday, is the lowest ever recorded. Recent events in regard to foreign exchange show that the fears entertained in the financial world for a considerable time after war was declared that the re-opening of the stock exchange would lead to liquidation by foreigners of American securities to such an extent that the United States would be robbed of all its gold, were entirely unfounded. On the contrary, as has been pointed out by the *Financial Chronicle*, what we are actually witnessing is a state of the foreign exchange where we could draw gold in such volume from abroad that financial disaster in Europe could scarcely be averted if we chose to assume an attitude such as the Bank of England assumed toward us last autumn when it insisted that we must pay for our maturing obligations to foreigners by the actual shipment of gold and that transfers of credit would not be entertained.

The explanation of the present very low foreign exchange rates is not to be found entirely in the excess of exports over imports, for there have been many times in the past when the trade balance in favor of United States was even greater than it is at present and when exchange rates were not demoralized. It is, of course, difficult to ascertain underlying causes, but it is very strongly suspected that great sums of money are being sent from the nations at war for safe-keeping to this country. It has been recalled that during the Franco-Prussian war in 1870 gold from France and Germany was piled up in London and that the Rothschild fortune grew from funds confided to members of that family during the Napoleonic wars.

Industrial Stocks

The assurance that there will not be a special session of congress had a favorable effect on business last week, but the increasing complications in connection with the war, especially with foreign commerce, had a depressing effect. Upon the whole, however, the February reaction which is expected to follow the January rise in stocks has not been as pronounced as in many past years and various efforts of the bears to pound the market have met with little success.

Most of the changes in industrial stocks during the past week were losses, as shown in the following table:

American Can, prfd.	—1⅞
American Car & Foundry Co.	—3⅜
American Locomotive Co.	...
American Locomotive Co., prfd.	—2
American Steel Foundries	— ⅛
Baldwin Locomotive Co.	+1
Baldwin Locomotive Co., prfd.	+1
Bethlehem Steel Co.	—2¼
Bethlehem Steel Co., prfd.	— ⅜
General Electric	—1¾
Pressed Steel Car Co.	—3½
Pullman Palace Car Co.	— ½
Railway Steel Spring	—2
Republic Iron & Steel Co.	...
Sloss, Sheffield Steel & Iron Co.	—1¼
United States Steel	—1⅜
United States Steel, prfd.	— ½
Westinghouse Mfg.	—5⅛

Receiver for Furnace Company

Cincinnati, Feb. 23.—Neil Robinson, a coal operator, of Charleston, W. Va., has been named receiver for the La Follette Iron Co., La Follette, Tenn. Mr. Robinson has been receiver of the La Follette Coal, Iron & Railway Co., also of La Follette, Tenn., for about a year, and was chosen in the same connection for the La Follette Iron Co. so that the business of both companies could be carried on under one head. In a report given out, it is stated that the La Follette Iron Co. is perfectly solvent, but that it has been unable recently to move the large stock of iron piled in its furnace yards or to borrow money on it, and a temporary receiver was therefore asked for until these matters can be adjusted. It is also stated that practically all of this iron is under contract, but melters to whom it has been sold have been very slow in specifying deliveries.

A Profitable Year

The Illinois Malleable Iron Co., Chicago, held its annual meeting of shareholders on Feb. 13, at which was submitted the customary financial report showing the results of the year's operations to have been profitable notwithstanding the unfavorable conditions. Out of the year's earnings was declared the usual dividends and a substantial balance carried to surplus account.

The following officers were elected: President, Henry E. Bullock; vice president and treasurer, James E. Bullock; secretary, William J. Akin, who together with C. F. Drozeski and J. R. Steneck constitute the directorate.

Deere & Co. Report

The annual report of Deere & Co., Moline, Ill., agricultural implement and machinery makers, for the fiscal year ended Oct. 31, 1914, indicates an unfavorable period. Net earnings decreased $2,019,144 from the previous year and there was a deficit after preferred dividends, of $562,916, against a surplus of $1,456,227 earned in the fiscal year ended Oct. 31, 1913. The policy of the company in the past year has been to push collections, reduce inventories, increase the cash on hand and other quick assets with the idea of placing the concern in a strong position financially. The statement, as a result, shows the proportion of quick assets to total liabilities at the close of the fiscal year was 283 per cent, an increase of 33 per cent over that of the previous year. Collections are reported good in all sections except the cotton states and western Canada.

Financial Notes

The B. F. Biggs Pump Co., Lafayette, Ind., has issued additional preferred stock to the amount of $30,000.

The plant and other assets of the defunct United Refrigerator & Ice Machine Co., Kenosha, Wis., will be sold at public auction at the plant on March 15. The appraisal value is in excess of $200,000.

The Griffin Wheel Co., Chicago, during the past fiscal year ending Dec. 31, earned a balance for dividends equivalent to 6 per cent on the $6,000,000 preferred and 6.03 per cent on the $9,282,000 common.

Stockholders of the Canton Sheet Steel Co., Canton, O., will meet March 15 to consider the increase of capital stock from $50,000 to $200,000 to make some large improvements and obtain greater working capital.

Following a conference of lawyers and bankers in Alton, Ill., Feb. 18, it was announced that the plant of the Alton Steel Co., in that city, which has been closed several months, probably would be re-opened May 1. The closing of the plant, following receivership proceedings, threw several hundred men out of employment.

The Great Lakes Dredge & Dock Co., Chicago, reports $963,000 net earnings in the fiscal year ended Dec. 31, 1914. After charging off $150,000 for depreciation, a balance remained of $813,192, equivalent to about 16½ per cent on the outstanding $4,901,000 capital stock. The surplus for the year was $519,132, compared with $426,024 the previous year.

The International Oxygen Co., 115 Broadway, N. Y., at the last meeting of the board of directors decided to declare a dividend of 6 per cent on all outstanding stock. The company states that this action was taken after careful consideration. While the present business of the company is not all that could be desired, the surplus earned last year was highly satisfactory.

Knocked Out

Was Anti-Efficiency Amendment by the Senate

Washington, Feb. 23.—After a discussion lasting almost eight hours, the senate late this afternoon sustained the committee on military affairs which struck out the house amendment in the army bill providing for abolishing the Taylor and other efficiency systems in government plants. The amendment was divided into two parts upon the motion of Senator Lodge, one part relating to the use of the stop watch and the other part to the premium system. On the vote to abolish the stop watch system, it was lost 33 to 27. The vote was taken on a motion of Senator Hughes to lay the Lodge amendments on the table. The vote on the last half of the committee amendment was 32 to 27 in favor of the committee. Its entire amendment retaining the efficiency system was therefore upheld.

Inspect Turbines

Engineers Make Inspection Trip to Westinghouse Plant

Members of the Engineers' Society of Western Pennsylvania, on Feb. 20, inspected the last of three 30,000-kilowatt turbines, built by the Westinghouse Machine Co., East Pittsburgh, Pa., for the Interborough Rapid Transit Co., New York. The turbine units are being installed in the Seventy-fourth street power station of the Rapid Transit company, to take the place of four reciprocating corliss engines having a total capacity of 28,000 kilowatts. The installation of the turbines will increase the capacity of the plant 220 per cent without increasing its size.

Frances Hodgkinson, chief engineer of the turbine department, gave a short illustrated talk covering the salient features of the machines before the inspecting party entered the shops.

The first of these turbines has been operating since the latter part of December, carrying loads varying from 10,000 to 35,000 kilowatts. While no official tests have been made, it is said that Venturi meter measurements show an average steam consumption of 11.65 pounds per kilowatt hour. The steam expansion is carried out in two separate elements. This construction is unique in that each of the elements drives a separate alternator operating at the most desirable speed for the turbine. The high pressure element, which operates at 1,500 revolutions per minute, is single-flow, the end thrust being taken care of by small dummies and a Kingsbury thrust bearing. The low pressure element operates at 750 revolutions per minute, and is double-flow.

The governor on the high pressure end controls the speed of both elements. Such an arrangement gives variable back pressure on the high pressure section, thus insuring best efficiency at varying loads as well as at rated load. The generators are permanently connected by cables so the two elements operate in parallel, the low-pressure carrying all the load it can with the steam delivered to it by the high pressure element.

The two exhaust outlets in the double-flow low pressure section have an aggregate area of 190 square feet providing for a steam velocity of 250 feet per second, the steam pressure corresponding to 29 inches vacuum. To simplify the casting, all stationary blades in the low-pressure end are carried by separate blade rings.

The following data are of interest:

	Pounds.
Weight of high-pressure rotor	24,000
Weight of high-pressure cylinder	56,000
Weight of low-pressure rotor	128,000
Weight of low-pressure cylinder	330,000
Weight of blading	38,400
Weight of complete unit including generators	1,560,000
	Inches.
Diameter of steam inlet	20
Diameter of low-pressure drum	106

With reaction blading of the sizes used in these machines, it is said, the leakage factor becomes quite small and that high economy is obtained. The blade dimensions in the high pressure element increase from 4 to 9 inches, and in the low pressure element from 6 to 18 inches. The blade speeds are moderate, the mean speed of the low pressure blades being 400 feet per second.

The operation of both high and low pressure elements at different revolutions per minute permits conservative construction. In this instance, it is said, the highest stress in the rotating drums and discs at 20 per cent overspeed does not exceed 14,000 pounds per square inch.

Heavy Bolt Specifications

Cleveland, Feb. 24.—Announcement that steel bars would be held at 1.15c after Feb. 28 leads makers of nuts, bolts and rivets to hope that prices for those products will stiffen. All three products have been selling at rather low figures for practically a year. A prominent middle man has specified for about 2,000 tons of bolts in the last three weeks against a contract placed in January.

The United States Bureau of Standards has issued a bulletin on the Emissivity of Metals and Oxides.

New Rates

On Iron and Steel Products Average More Than 5 Per Cent

New freight rates, embodying the general advance of 5 per cent allowed in central classification freight territory by the interstate commerce commission and covering all eastern territory, became effective on all iron and steel products, Feb. 23. The advances which have been scheduled by the railroads in their new tariffs in many cases figure out more than 5 per cent. This is especially true with regard to finished and semi-finished iron and steel products. The general average of all advances is in excess of 5 per cent by some fraction.

The new rates on finished iron and steel products in cents per 100 pounds and on billets in dollars per gross ton from Pittsburgh to important eastern points, are as follows:

	Finished per 100 pounds. Carloads.	Finished per 100 pounds. Less carloads.	Billets per gross ton, carloads.
New York	16.9	20.1	$2.76
Philadelphia	15.9	19.1	2.56
Boston	18.9	22.1	3.16
Baltimore	15.4	18.6	2.46
Newark	16.9	20.1	2.76
Jersey City	16.9	20.1	2.76
Norfolk	21.3	25.3	2.96
Washington	15.4	18.6	2.46
Albany	16.9	20.1	2.76
Trenton	16.9	20.1	2.76
Harrisburgh	15.4	18.6	2.56
Wilmington	15.9	19.1	2.56
Reading	15.9	19.1	2.56
Providence	18.9	22.1	3.16
New Haven	18.9	22.1	3.16
Worcester	18.9	22.1	3.16
Bridgeport	18.9	22.1	3.16
Portland	18.9	22.1	3.16

The rates from Johnstown, Pa., to these various points are 1½ cents less on carloads and 2 cents less on less carloads, than the Pittsburgh rate. On billets, the rate from Johnstown is 30 cents under the Pittsburgh rate to the points named.

Eastern mill rates, on finished iron and steel products, in cents per 100 pounds, taking New York as a typical point of shipment, show the following changes:

	New rate. Carloads.	New rate. Less carloads.	Old rate. Carloads.	Old rate. Less carloads.
Bethlehem	7.9	11.0	7.5	10.5
Coatesville	9.5	12.6	9.0	12.0
Phoenixville	9.5	12.6	9.0	12.0
Steelton	10.5	13.7	10.0	13.0
Pottsville	10.5	13.7	10.0	13.0
Lebanon	10.5	13.7	10.0	13.0

The all-rail rates on pig iron per gross ton from leading producing centers to important eastern consuming points are as follows:

Buffalo to:—	
New York	$2.58
New England	2.58
Newark	$1.84 to 2.10
Jersey City	2.10
Lehigh Valley to:—	
New York tidewater	.74
Philadelphia	.79
New England	2.00
Schuylkill Valley to:—	
New York tidewater	.95
Philadelphia	.42 to .63
New England	2.00
Central Pennsylvania to:—	
New York tidewater	2.16
Philadelphia	1.68
New England	2.48
Lebanon district to:—	
New York tidewater	1.11
Philadelphia	.90
New England	2.00

State Laws on Removal of Dust

An Exhaustive Analysis of the Legislation in Every State—Standard Specifications for Dust Removal Systems

BY H COLE ESTEP

SIXTEEN of the 48 states require the installation of dust removal apparatus in connection with the operation of grinding, polishing or buffing wheels. In ten other states where there are not specific laws on this subject, the general labor legislation is of such a character that the state factory inspection departments have the power to compel the employment of exhaust fans in foundries, machine shops or plating works where there are grinding, cleaning, buffing or polishing rooms. In 22 states there is no legislation on the subject of dust removal. These commonwealths are mostly in the agricultural sections of the south and west, where there is relatively little industrial development. Of the prominent manufacturing states of the north and east, only Maine, New Hampshire and Vermont have failed to pass specific legislation compelling the installation of efficient dust removal apparatus.

Most of the laws possess a broad character which allows the factory inspectors considerable latitude in determining what constitutes satisfactory and efficient apparatus. But in a few instances, notably New York and Wisconsin, elaborate specifications have been drawn up which cover the subject very fully. The states which now have specific laws regarding dust removal in force are as follows: Colorado, Connecticut, Delaware, Illinois, Indiana, Iowa, Massachusetts, Michigan, Missouri, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Washington and Wisconsin. That the subject is an important one is conceded on all sides and there is little doubt but that many states which now have no laws on this subject will take up the question in the next few years. Bills are now being framed or considered in Maine, Texas and Vermont.

Progressive employers have long been aware that efficient dust exhaust systems in polishing, cleaning or grinding rooms not only conserve the health and improve the comfort of employes, but also increase the output and lower the costs in these departments. For this reason the subject has been given special study by manufacturers of grinding machinery, fans, blowers, etc., so that today the employer has both very efficient and moderate priced apparatus at his command.

Lack of proper dust removal facilities expose workmen to many diseases affecting the throat and lungs, including bronchitis and tuberculosis. In some states employers are subject to suit and damages where such diseases can be shown to have been contracted amid unsanitary working con-

FIG. 1—PRIMITIVE METHOD OF CLEANING CASTINGS EXPOSING WORKMAN TO DUST

FIG. 2—BUFFING WHEELS PROPERLY PROTECTED BY DUST EXHAUST HOODS

ditions. The Illinois law is specially comprehensive and some sidelights are thrown on its provisions by a recent paper prepared by Barney Cohen, assistant chief of the department of factory inspection and published by the state. Portions of this paper are as follows:

"The Illinois department of factory inspection is ordering all hoods of an improper construction to be replaced by those that have the branch pipe connected to the hood at a point directly beneath that part of the wheel which comes in contatct with the work and as near to the point of work on the wheel as the character of the work will permit. We also advise and urge that an additional suction be placed in the rear of the wheel near the center, in order that the light-floating dust that escapes the front suction may be caught up and carried off. Where such an additional suction is used, care must be taken to so design the two suctions that their combined area is equal to the area of the branch pipe into which they open. The light dust constitutes the dangerous elements and there is a sufficient amount of it passing the front intake of the hood to cause danger to the employes.

"Hoods must be of substantial character, so as to act as a guard for the wheel. Numerous accidents occur to workmen by pieces of material catching in the wheels and revolving with them. This is the case very frequently on buffing wheels, and as a result of too light hoods, employes' hands are frequently badly mangled. Other important points in the construction of exhaust systems are to eliminate as many bends and elbows as possible. Install your dust collector as near to the fan as possible, and the fan as near to the wheel as possible. All branch pipes on blower systems where over three machines are connected should be equipped with blast gates for the purpose of equalizing the suction power, so that the pipes farthest away from the fan will receive the required suction.

"In the construction of an exhaust system the numerous prepared tables, as far as they apply to horsepower and revolutions per minute of fan for a given suction, should be used with caution, because no set table will apply to all systems; increase the resistance, and the horsepower and revolutions of fan must be increased; reduce the resistance and, vice versa, you can reduce your revolutions of fan and horsepower. In other words, the layout of practically every exhaust system involves problems that cannot be solved by the direct application of standard formulas, and only men of long mechanical experience should be entrusted with their design and installation. This condition has been brought to the attention of the department so often that the department feels the need of the enactment of a law compelling any man or firm engaged or liable to engage in the design and installation of exhaust systems to pass a rigid examination as to his fitness, and to be licensed in the same manner as a plumber or architect. The department feels that everyone engaged in the designing and installing of mechanical devices whose purpose it is to protect the life and health of men should show himself capable.

"A fault of several of the constructors of exhaust systems is an attempt by them to convince the manufacturer that the 5-inch suction measured by a column of water in a 'U'-shaped tube, as required by the Illinois law, is not necessary. A 5-inch suction is necessary because it will extend far enough from the opening of the branch pipe to cover the zone of the wheel, thereby removing dangerous floating dust."

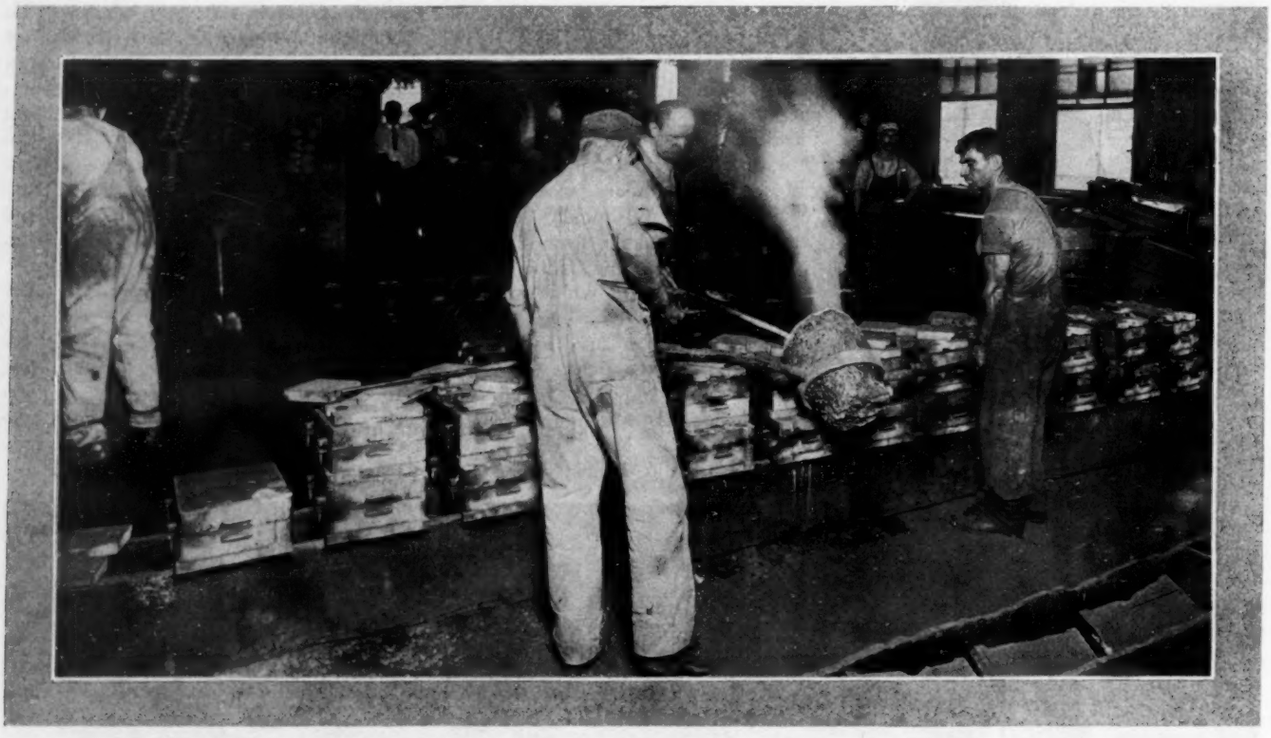


FIG. 3—CASTING YELLOW BRASS IN A CLOSED ROOM—WORKMEN SUBJECTED TO ZINC FUMES

The specifications for dust removal systems issued by the state of New York were prepared by William Newell. In explanation of the specifications, the labor commissioner of the state makes the following comment:

"These specifications are issued with the view of bringing about the efficient removal of dust from grinding and buffing wheels. Their object is to prevent the construction of exhaust systems on such faulty designs as making the main suction duct much too small and, not infrequently, the same size throughout its length, running the branch pipes into the main at right angles and sometimes at the bottom of the main, too small a fan, too small a discharge pipe from the fan,

too small a cyclone separator or dust collector, etc., with the result that the suction is entirely inadequate to carry off the dust, which then clogs the ducts and spreads about the room, to the injury of the workmen's health.

Higher Efficiency

"A room free from dust is also productive of higher efficiency of both men and machinery. It has been proven time and again in actual practice that the output of a workman is increased if he works under healthful atmospheric conditions. Freedom from dust is also conducive to less wear and friction, and hence longer life, of machinery.

"Lastly these specifications are designed to protect manufacturers from spending their money on useless exhaust systems installed by contractors who are either ignorant or careless."

The specifications are as follows;

Minimum sizes of branch pipes allowed for different sized emery or other grinding wheels:

Diameter of wheels	Maximum grinding surface, sq. ins.	Minimum diameter of branch pipe in ins.
6 in. or less, not over 1 in. thick	19	3
7 in. to 9 in. inclusive, not over 1½ in. thick	43	3½
10 in. to 16 in. inclusive, not over 2 in. thick	101	4
17 in. to 19 in. inclusive, not over 3 in. thick	180	4½
20 in. to 24 in. inclusive, not over 4 in. thick	302	5
25 in. to 30 in. inclusive, not over 5 in. thick	472	6

In case a wheel is thicker than given in the above tabulation, or if a disc instead of a regular wheel is used, it must have a branch pipe no smaller than is called for by its grinding surface, as given above.

Minimum sizes of branch pipes allowed for different sized buffing, polishing or rag wheels, as they are variously called, are as follows:

Diameter of wheels	Maximum grinding surface, sq. ins.	Minimum diameter of branch pipe in ins.
6 in. or less, not over 1 in. thick	19	3½
7 in. to 12 in. inclusive, not over 1½ in. thick	57	4
13 in. to 16 in. inclusive, not over 2 in. thick	101	4½
17 in. to 20 in. inclusive, not over 3 in. thick	189	5
21 in. to 24 in. inclusive, not over 4 in. thick	302	5½
25 in. to 30 in. inclusive, not over 5 in. thick	472	6½

Branch pipes must not be less than the sizes specified above throughout their entire length. All branch pipes must enter the main suction duct at an angle not exceeding 45 degrees and must incline in the direction of the air flow at junction with main. Branch pipes must not project into main duct. All laps in piping must be made in the direction of the air flow. All bends, turns, or elbows, whether in main or branch pipes, must be made with a radius in the throat at least equal to one and one-half times the diameter of the pipe on which they are connected.

The inlet of the fan or exhauster shall be at least 20 per cent greater in area than the sum of the areas of all the branch pipes and such increase shall be carried proportionately throughout the entire length of the main suction duct, in other words, the area of the main at any point shall be at least 20 per cent greater than the combined areas of the branch pipes entering it between such point and the tail end or dead end of the system. If such increase is made greater than 20 per cent, the area of the main at any point, except that portion of it between the branch entering it nearest the fan and the fan, shall bear approximately the same ratio to the combined areas of the branches preceding that point as the area of the main at the branch nearest the fan bears to the combined areas of all the branches. This provision is made to permit the use of a fan having a larger inlet area than the area of the main at the branch pipe nearest to the fan, if desired.

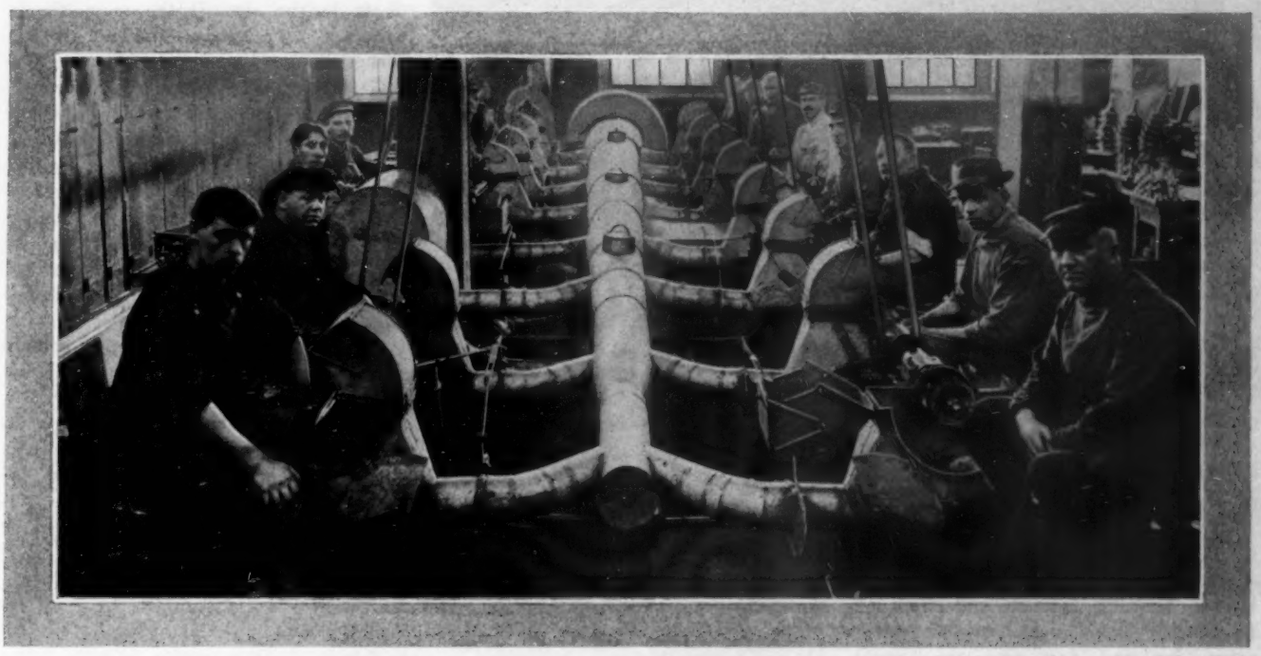


FIG. 4—PROPERLY ARRANGED DUST EXHAUST SYSTEM IN A NEW JERSEY POLISHING SHOP

For the convenience of those wishing to use it, Table II shows what the size of the main suction duct should be at any point for any number of uniform-size branch pipes when the main duct is made 20 per cent greater than the combined areas of the branches entering it.

The fan outlet and the discharge pipe from the fan shall be at least 20 per cent greater in area than the sum of the areas of all branch pipes. This applies to the discharge pipe throughout its entire length. The main trunk lines, both suction and

FIG. 5—BUFFING BRASS WITHOUT A PROPER DUST EXHAUST SYSTEM

discharge, shall be provided with suitable clean-out doors not over 10 feet apart and the end of the main suction duct shall be blanked off with a removable cap placed on the end.

Sufficient static suction head shall be maintained in each branch pipe within 1 foot of the hood to produce a difference of level of 2 inches of water between the two sides of the U-shaped tube. Test is to be made by placing one end of a rubber tube over small hole made in pipe, other end of the tube being connected to one side of U-shaped water-gage. Test is to be made with all branch pipes open and unobstructed.

Plans for all exhaust system installations, showing location and sizes of all wheels, hoods, main and branch pipes, fan and dust separator should be submitted to this department in duplicate for approval before work is begun and it must be clearly specified that the system is to be installed in strict accordance with the above specifications. The test specified above positively must be obtained before the system will be acceptable to the department of labor.

The contract for the installation of an exhaust system should contain a provision to the effect that payment will be withheld until the above test shall have been made and the system accepted by the department of labor.

In addition to the above specifications, which are compulsory, a number of recommendations are given below, which if observed, will make for still more efficient operation and longer life of the system.

Emery wheel and buffing wheel exhaust systems should be kept separate owing to danger of sparks from the former setting fire to the lint dust from the latter, if both are drawn into the same suction main.

In the case of undershot wheels, which is almost always the direction of rotation of both emery and buffing wheels, the main suction duct should be back of and below the wheels and as close to them as is practicable; or it should be fastened to the ceiling of the floor below, preferably the former. If behind the wheels, it should be not less than 6 inches above the floor at every point to avoid possible charring of the floor in case of fire in the main duct and also to permit sweeping under it. For similar reasons it should be at least 6 inches below any ceiling it may run under.

Both the main suction and discharge pipes should be made as short and with as few bends as possible, to avoid loss by friction. If one or the other must be of considerable length, it is best to place the fan not far beyond where the nearest branch enters the large end of the main, as a long discharge main is a lesser evil than a long suction main. Avoid any pockets or low places in ducts where dust might accumulate.

The main suction duct should be enlarged between every branch pipe entering it, whenever space permits, and in no case should the main duct receive more than two branches in a section of uniform area. All enlargements in the size of the main should be made on a taper and not by an abrupt change.

If there is a likelihood of a few additional wheels being installed in the future, it is advisable to leave a space for them between the fan and the first branch and to put in an extra size fan. Or, a space may be left beyond the fan so that the fan may be moved along and the main extended when it is actually decided to install additional wheels, provided the fan is of sufficient size to still comply with these specifications after the additional branches are added.

Branch pipes should enter the main on the top or sides—never at the bottom. Two branches should never enter a main directly opposite one another. Each branch pipe should be

FIG. 6—A WELL EQUIPPED SAND BLAST ROOM

equipped with a shut-off damper or blast gate as it is also called, which may be closed, if desirable, when the wheel is not in use. Not more than 25 per cent of such blast gates should be closed at one time; otherwise, the air velocity in the main duct may drop too low and let the dust accumulate in the bottom. Dampers should be of the sliding type; not the stovepipe or butterfly type.

It is very important that the lower part of the hood shall come far enough forward beneath the front of the wheel so that the dust will enter the hood and not fall outside of it altogether, even if the accomplishment of this result necessitates leaving considerable space between the wheel and the lower part of the hood in order that the hood shall not interfere with the work.

Branch pipes should lead out of the hood as nearly as possible at the point where the dust will naturally be thrown into them by the wheels. This is very important. An objectionable practice sometimes found where small work is polished is the use of a screen across the mouth of the branch pipe where it enters the hood. Such screens are an obstruction to the passage of material and the ravelings from buffing wheels are held against the screen by the suction, with the result that in a short time the draught is almost entirely cut off.

Use of a Trap

The use of a trap at the junction of the hood and branch pipe is good practice provided it is cleaned out regularly and not allowed to fill up with dust. This will catch the heavier particles and so take some wear off the fan. It will also serve to catch any nuts, pieces of tripoli, etc., dropped by accident, and in the case of work on small articles, will enable them to be recovered when dropped in the hood.

All bends, turns or elbows, whether in main or branch pipes, should be made with a radius in the throat of twice the diameter of the pipe on which they are connected, wherever space permits. Elbows should be made of metal one or two gages heavier than the pipe on which they are connected as the wear on them is much greater.

The withdrawal of air from a room by an exhaust system naturally tends to create a slight vacuum and for this reason inlets for air at least equal to the sum of the areas of the branch pipes should be left open.

Recommendations for the size of the cyclone separator or dust collector, as it is often called, are hard to give, as the separator must be proportioned to suit operating conditions, light dusts requiring a larger separator than heavy dusts. It is stated, a separator should be selected the area of whose inlet is at least as large as the area of the discharge pipe from the fan. For light buffing dusts, lint, etc., the air outlet from the top of the separator should be so large that the velocity of discharge will not exceed 300 to 480 feet per minute; then select a separator of which the other dimensions are proportionate. The air outlet should be provided with a proper canopy or elbow to exclude the weather but should be otherwise unobstructed. There should be ample clearance under the separator for the accumulation or storage of the dust which should never be allowed to pile up as high as the bottom of the separator.

FIG. 7—GRINDING STEEL CASTINGS IN A DUSTLESS ROOM

A drawing of an exhaust system laid out in conformity with these specifications for eight 14-inch emery wheels is furnished by the state. For eight 14-inch buffing wheels, the branch pipes would have to be not less than 4½ inches in diameter.

The state of Indiana has issued a table which shows the correct figures for diameter of pipes and speed, size and horsepower of fan required to produce an air velocity of 9,000 feet per minute under given conditions. These figures are shown in Table I. It is stated that the diameter of the fan inlet should be as large or larger than the diameter of the main suction pipe.

Following is given a summary of the laws of all the states in this country relating to the removal of dust in grinding, cleaning, polishing or buffing operations:

ALABAMA.—None.

ARIZONA.—None.

ARKANSAS.—None.

CALIFORNIA.—"In any factory, workshop, or other establishment where a work or process is carried on by which dust, filaments, or injurious gases are produced or generated, that are liable to be inhaled by persons employed therein, the person, firm, or corporation, by whose authority the said work or process is carried on, shall cause to be provided and used in said factory, work-shop or other establishment, exhaust fans or blowers with pipes and hoods extending therefrom to each machine, contrivance or apparatus by which dust, filaments, or injurious gases are produced or generated.

"The said fans and blowers, and the said pipes and hoods, all to be properly fitted and adjusted, and of such power and dimensions sufficient to effectually prevent the dust, filaments, or injurious gases produced or generated by the above said machines, contrivances or apparatuses, from escaping into the atmosphere of the room or rooms of said factory, workshop or other establishment where persons are employed."

COLORADO.—"That any person, firm, corporation or association operating a factory, mill, workshop, bakery, laundry, store, hotel, or any kind of an establishment wherein laborers are employed, or machinery used and manual labor is exercised by the way of trade for the purpose of gain within an enclosed room (private houses in which the employes live excepted) shall be provided in each workroom thereof with good sufficient ventilation and kept in a clean and sanitary state, and shall be so ventilated as to render harmless, so far as practicable, all gases, vapors, dust or other impurities, generated in the course of the manufacturing or laboring process carried on therein; and in any factory, mill, workshop, bakery, laundry, store, hotel, or any kind of an establishment wherein laborers are employed or machinery used in any enclosed rooms thereof by which dust is generated and inhaled to an injurious extent by the

persons employed therein, conveyors, receptacles or exhaust fans, or other mechanical means shall be provided and maintained for the purpose of carrying off or receiving and collecting such dust."

CONNECTICUT. — "Every employer whose business requires the operation or use of any emery, tripoli, rouge, corundum, stone, carborundum, or other abrasive, polishing, or buffing wheels, in the manufacture of articles of metal or iridium, or whose business includes any process which generates an excessive amount of dust, shall install and maintain in connection therewith such devices as may be considered necessary by the factory inspector and state board of health to remove from the atmosphere any dust created by such process.

"The factory inspector, with the state board of health, shall issue to any employer engaged in such business any orders necessary to render effective the foreging provision, and if within 60 days from the issuance of such order stating the changes to be made, such order shall not be complied with, the factory inspector may order such department closed until such order is complied with.

"The violation of any provision of the foregoing section or the failure to comply with any written order issued in accordance therewith within 60 days thereafter shall constitute a misdemeanor punishable by a fine of not more than five hundred dollars for each offense, and every such order shall be enforceable by the superior court or by a judge thereof if said court is not in session, by injunction on application of the factory inspector or of the state board of health."

Table I.

SIZES OF PIPES AND FANS FOR DUST EXHAUST SYSTEM

Indiana Law.

No. branch pipes.	Branch pipe 3 in. diameter.	Branch pipe 4 in. diameter.	Branch pipe 5 in. diameter.	Branch pipe 6 in. diameter.	Diameter of fan inlet.	Size of fan.	Rev. per minute.
	Main, in.	Main, in.	Main, in.	Main, in.			
2	5	6	7	9	6	1	2,460
4	6	8	10	12	8	2	2,150
6	8	10	13	15	10	25	1,920
8	9	12	14	17	12	30	1,820
10	10	13	16	19	14	35	1,565
12	11	14	17	21	15	40	1,380
14	12	15	19	23	17	45	1,230
16	12	16	20	24	19	50	1,080
18	13	17	21	26	21	55	985
20	14	18	22	27	23	60	905
22	14	19	24	29	25	65	860
24	15	20	25	30	31	70	785
26	16	21	26	31	37	80	700
28	16	21	27	32			
30	17	22	27	33			
32	17	23	29	34			
34	18	23	29	35			
36	18	24	30	36			
38	19	25	31	37			
40	19	26	32				

DELAWARE.—Law similar to Connecticut.

FLORIDA.—None.

GEORGIA.—None.

IDAHO.—None.

ILLINOIS. — "That all persons, companies or corporations operating any factory or workshop where emery wheels or emery belts of any description are used, either solid emery, leather, leather-covered, felt, canvas, linen, paper, cotton, or wheels or belts rolled or coated with emery or corundum or cotton wheels used as buffs, shall provide the same with blowers, or similar apparatus, which shall be placed over, beside or under such wheels or belts in such a manner as to protect the person or persons using the same from the particles of dust produced and caused thereby, and to carry away the dust arising from or thrown off by such wheels or belts while in operation directly to the outside of the building or to some receptacle placed so as to receive and confine such dust.

"Provided, that grinding machines upon which water is used at the point of the grinding contact shall be exempt from the provisions of this Act, and provided, this Act shall not apply to small shops employing not more than one man in such work.

"It shall be the duty of any person, company or corporation operating any such factory or workshop to provide or construct such appliances, apparatus, machinery or other things necessary to carry out the purpose of this Act, as set forth in the preceding section as follows: Each and every such wheel shall be fitted with a sheet of case iron or hood or hopper of such form and so applied to such wheel or wheels that the dust or refuse therefrom will fall from such wheels or will be thrown into such hood or hopper by centrifugal force and be carried off by the current of air into a suction pipe which is attached to same hood or hopper.

"Each and every such wheel 6 inches or less in diameter shall be provided with a 3-inch suction pipe; wheels 6 inches to 24 inches in diameter with 4-inch suction pipe; wheels from 24 inches to 36 inches in diameter with 5-inch suction pipe; and all wheels larger in diameter than those stated above shall be provided each with a suction pipe not less than 6 inches in diameter.

"The suction pipe from each wheel, so specified, must be full size to the main trunk suction pipe and the main suction pipe to which smaller pipes are attached shall, in its diameter and capacity, be equal to the combined area of such smaller pipes attached by the same, and the discharge pipe from the exhaust fan, connected with such suction pipe or pipes, shall be as large or larger than the suction pipe.

"It shall be the duty of any person, company or corporation operating any such factory or workshop to provide the necessary fans or blowers to be connected with such pipe or pipes, as above set forth, which shall be run at a rate of speed as will produce a velocity of air in such suction or discharge pipes of at least 9,000 feet per minute to an equivalent suction or pressure of air equal to raising a column of water not less than 5 inches in a U-shaped tube. All branch pipes must enter the main trunk pipe at an angle of 45 degrees or less, the main suction or trunk pipe shall be below the emery or buffing wheels and as close to the same as possible, and to be either upon the floor or beneath the floor on which the machines are placed to which such wheels are attached. All bends, turns or elbows in such pipes must be made with easy, smooth surfaces, having a radius in the throat of not less than two diameters of the pipe on which they are connected.

"Any such person or persons or company, or managers, or directors of any such company or corporation who shall have the charge or management of such factory or workshop, who shall fail to comply with the provisions of this Act, shall be deemed guilty of a misdemeanor, and upon conviction thereof before any court of competent jurisdiction, shall be punished by a fine of not less than $25 and not exceeding $100."

The Illinois law also contains the following provision: "All factories, mercantile establishments, mills or workshops shall be kept free from gas of effluvia arising from any sewer, drain, privy or other nuisance on the premises. All poisonous and noxious fumes or gases arising from any process, and all dust of a character injurious to the health of the persons employed, which is created in the course of a manufacturing process, within such factory, mill or workshop, shall be removed, as far as practicable, by either ventilating or exhaust devices."

INDIANA. — "Exhaust fans of sufficient power shall be provided for the purpose of carrying off dust from emery wheels and grindstones and dust-creating machinery from establishments where used."

IOWA.—"All persons, companies or corporations operating any factory or workshop where emery wheels or emery belts of any description, or tumbling barrels used for rumbling or polishing castings, are used, shall provide the same with blowers and pipes of sufficient capacity, placed in such a manner as to protect the person or persons using same from the particles of dust produced or caused thereby, and to carry away said particles of dust arising from or thrown off such wheels, belts or tumbling barrels while in operation, directly to the outside of the building, or to some receptacle placed so as to receive or confine such particles of dust; provided, however, that grinding machines upon which water is used at the point of grinding contact, and small emery wheels which are used temporarily for tool grinding, are not included within the provisions of this section, and the shops employing not more than one man at such work may, in the discretion of the commissioner of the bureau of labor of the state, be exempt from the provisions hereof. Any factory, workshop, print-shop or other place where molten metal or other material which gives off deleterious gases or fumes is kept or used shall be equipped with pipes or flues so arranged as to give easy escape to such gases or fumes into the open air, or provided with other adequate ventilators."

KANSAS.—No specific law on the subject, but state factory inspectors are empowered to order dust exhaust apparatus wherever it seems necessary to protect the health and comfort of employes.

KENTUCKY.—None.

LOUISIANA.—None.

MAINE.—No specific legislation.

MARYLAND.—No specific legislation.

MASSACHUSETTS. — "If, in a workshop, or factory any process is carried on by which dust is caused which may be inhaled to an injurious extent by the persons employed therein, and it appears to an inspector of the state board of labor and industries that such inhalation would be substantially diminished without unreasonable expense by the use of a

fan or by other mechanical means, such fan or other mechanical means, if he so direct, shall be provided, maintained and used.

"A criminal prosecution shall not be instituted for any violation of the provisions of the two preceding sections unless such employer neglects, for four weeks after the receipt of a notice in writing, to make such changes in his factory or workshop as shall be ordered by an inspector of the state board of labor and industries.

"Any person, firm or corporation operating a factory or workshop in which emery wheels or belts or buffing wheels or belts injurious to the health of employes are used shall provide such wheels and belts with a hood or hopper connected with suction pipes, and with fans or blowers, in accordance with the provisions hereinafter contained, which apparatus shall be so placed and operated as to protect any person using such wheel or belt from the particles or dust produced by its operation, and to convey the particles or dust either outside of the building or to some receptacle so placed as to receive and confine such particles or dust.

"Every such wheel shall be fitted with a sheet iron or cast iron hood or hopper of such form and so placed that the particles or dust produced by the operation of the wheel or of any belt connected therewith shall fall or will be thrown into such hood or hopper by centrifugal force; and the fans or blowers shall be of such size and shall be run at such speed as will produce a volume and velocity of air in the suction and discharge pipes sufficient effectually to convey all particles or dust from the hood or hopper through the suction pipes and so outside of the building or to a receptable as aforesaid. The suction pipes and connections shall be suitable and efficacious, and such as shall be approved by an inspector of the state board of labor and industries.

"The two preceding sections shall not apply to grinding machines upon which water is used at the point of grinding contact, nor to solid emery wheels used in saw mills, or in planing mills or in other wood working establishments, nor to any emery wheel 6 inches or less in diameter used in establishments where the principal business is not emery wheel grinding.

"Whoever fails to comply with any provision of the preceding sections shall, for the first offense be punished by a fine of not less than $25 nor more than $100, and, for a second offense he shall be punished by the fine aforesaid or by imprisonment in jail for not more than 60 days, or by both fine and imprisonment."

MICHIGAN.—Law provides for the installation of dust exhaust where necessary and is similar in its general nature to the Ohio statute.

MINNESOTA.—No specific legislation.

MISSISSIPPI.—None.

MISSOURI.—"Every person, firm or corporation using any polishing wheel or machine of any character which generates dust, smoke or poisonous gases in its operation, shall provide each and every such wheel or machine with a hood, which shall be connected with a blower or suction fan of sufficient power to carry off said dust, smoke and gases and prevent its inhalation by those employed about said wheel or machine; and any violation of this section is hereby declared to be a misdemeanor, and a person, firm or corporation so violating this section shall, upon conviction, be punished by a fine of not less than $100 nor more than $500 for each and every offense. It shall be the duty of the factory inspector and his deputies to see that this section is enforced and to prosecute any violations thereof.

"In all establishments in this state wherein labor is employed, where any process is carried on by which dust or smoke is generated the factory inspector and his deputies shall have the power and the authority to order that a fan or some other contrivance be put in to prevent the inhalation of such dust or smoke by employes."

MONTANA.—None.

NEBRASKA.—"If in any of the aforesaid places, any process is carried on, by which dust or fumes is caused, which may be inhaled by the persons employed therein, or if the air should become exhausted or impure, there shall be provided a fan or other such mechanical device as will substantially carry away all such dust or fumes or other impurities, subject to the approval of the commissioner of labor, his deputies or factory inspectors.

"All persons, companies or corporations operating any factory or work-shop where grinding wheels, or grinding machines,' emery wheels or emery belts of any description are used, either solid emery, leather covered, felt, canvas, linen, paper, cotton, or wheels or belts rolled or coated with emery or carborundum or cotton wheels used as buffs, shall, when deemed necessary, by the labor commissioner, his deputy or any factory inspector, provide such wheels or belts with blowers or similar apparatus, which shall be placed over, beside or under such wheels or belts in such manner as to protect the person or persons using the same from the particles of the dust produced and caused thereby, and to carry away the dust arising from or thrown off by such wheels or belt while in operation directly to the outside of the building or to some receptacle placed so as to receive and confine such dust; Provided, that grinding machines upon which water is used at the point of grinding contact and other wheels used for tool grinding shall be exempt from the provisions of this act."

NEVADA.—None.

NEW HAMPSHIRE.—None.

NEW JERSEY.—Law and specifications substantially the same as in Ohio.

NEW MEXICO.—None.

NEW YORK.—"All grinding, polishing or buffing wheels used in the course of the manufacture of articles of the baser metals shall be equipped with proper hoods and pipes and such pipes shall be connected to an exhaust fan of sufficient capacity and power to remove all matter thrown off such wheels in the course of their use. Such fan shall be kept running constantly while such grinding, polishing or buffing wheels are in operation; except that in case of wet-grinding it is unnecessary to comply with this provision unless required by the rules and regulations of the industrial board. All machinery creating dust or impurities shall be equipped with proper hoods and pipes and such pipes shall be connected to an exhaust fan of sufficient capacity and power to remove such dust or impurities; such fan shall be kept running constantly while such machinery is in use; except where, in case of wood-working machinery, the industrial board shall decide that it is unnecessary for the health and welfare of the operatives."—New York has also issued a set of standard specifications for dust removal apparatus which are published elsewhere in this article.

NORTH CAROLINA.—None.

NORTH DAKOTA.—None.

OHIO.—"They shall provide emery wheels or belts of solid emery, leather covered, felt, canvas, linen, paper, cotton or wheels or belts, rolled or coated with emery or corundum, or cotton wheels used as buffs, with blowers or similar apparatus placed over, beside or under such wheels or belts in such a manner as to protect the person or persons

Table II.

AREA OF PIPES SPECIFIED BY NEW YORK LAW

Number of branch pipes.	Diameter of Branch Pipes in Inches								
	3	3½	4	4½	5	5½	6	6½	7
	Area of each Branch Pipe in square inches.								
	7.07	9.62	12.566	15.9	19.635	23.758	28.274	33.183	38.485
	Area of each Branch Pipe plus 20 per cent (square inches).								
	8.484	11.544	15.08	19.08	23.562	28.51	33.93	39.82	46.182
1	3 3/8	3 7/8	4 3/8	5	5 1/2	6	6 5/8	7 1/8	7 3/4
2	4 3/4	5 1/2	6 1/4	7	7 3/4	8 3/8	9 1/4	10 3/8	10 7/8
3	5 3/4	6 5/8	7 5/8	8 3/4	9 1/2	10 1/2	11 1/2	12 3/8	13 1/2
4	6 5/8	7 3/4	8 3/4	9 7/8	11	12 1/8	13 1/8	14 1/4	15 3/8
5	7 3/8	8 5/8	9 7/8	11	12 1/4	13 1/2	14 3/4	16	17 1/8
6	8 1/8	9 1/2	10 3/4	12 1/8	13 1/2	14 3/4	16 1/8	17 1/8	18 3/4
7	8 3/4	10 1/4	11 3/8	13 1/8	14 1/2	16	17 1/2	18 3/8	20 1/4
8	9 3/4	10 7/8	12 3/8	14	15 1/2	17 1/4	18 5/8	20 1/8	21 3/4
9	9 7/8	11 1/2	13 1/8	14 7/8	16 1/2	18 1/8	19 3/4	21 3/8	23
10	10 1/2	12 1/8	13 7/8	15 3/8	17 3/8	19 1/8	20 3/4	22 1/2	24 1/8
11	11	12 3/4	14 3/8	16 3/8	18 1/4	20	21 7/8	23 3/8	25 1/2
12	11 1/2	13 3/8	15 1/4	17 1/8	19	20 7/8	22 3/8	24 1/4	26 1/8
13	11 7/8	13 7/8	15 7/8	17 7/8	19 3/4	21 3/4	23 3/8	25 3/4	27 3/4
14	12 3/4	14 3/8	16 1/2	18 1/2	20 1/2	22 3/8	24 3/8	26 1/4	28 3/8
15	12 3/4	14 7/8	17	19 1/8	21 1/4	23 3/8	25 1/2	27 5/8	29 1/4
16	13 1/4	15 3/8	17 3/8	19 3/4	22	24 1/8	26 1/8	28 1/2	30 1/4
17	13 3/8	15 7/8	18 1/8	20 3/8	22 3/8	24 3/8	27 1/8	29 1/8	31 1/8
18	14	16 3/8	18 3/8	21	23 1/4	25 3/8	27 7/8	30 1/4	32 3/8
19	14 3/8	16 3/4	19 1/8	21 1/2	23 7/8	26 1/4	28 3/4	31 1/8	33 1/2
20	14 3/4	17 1/8	19 3/8	22 1/8	24 1/2	27	29 1/2	31 7/8	34 3/8
21	15 1/8	17 3/8	20 1/8	22 3/8	25 1/8	27 3/8	30 1/8	32 3/4	35 1/8
22	15 1/2	18	20 3/8	23 1/8	25 3/4	28 3/8	30 7/8	33 1/2	36
23	15 3/4	18 1/2	21 1/8	23 3/4	26 3/8	29	31 1/2	34 1/4	36 3/4
24	16 1/8	18 7/8	21 1/2	24 1/4	26 7/8	29 3/8	32 1/4	34 7/8	37 3/4
25	16 1/2	19 1/4	22	24 3/4	27 1/2	30 1/4	32 7/8	35 5/8	38 1/4
26	16 3/4	19 5/8	22 3/4	25 1/8	28	30 3/4	33 1/2	36 3/8	39 1/8
27	17 1/8	20	22 7/8	25 5/8	28 1/2	31 3/8	34 1/8	37	39 7/8
28	17 1/2	20 3/8	23 1/4	26 1/8	29	32	34 3/4	37 3/4	40 5/8
29	17 3/4	20 3/4	23 5/8	26 5/8	29 1/2	32 1/2	35 1/2	38 3/8	41 3/8
30	18	21	24	27	30	33	36	39	42

using them from particles or dust produced and caused thereby. They shall provide each emery wheel with a sheet or cast iron hood or hopper of such form and so applied to it that the dust or refuse therefrom will fall from such wheels or will be thrown into such hood or hopper by centrifugal force and be carried off by the current of air into a suction pipe attached to such hood or hopper.

"They shall provide an emery wheel 6 inches or less in diameter with a 3-inch suction pipe, an emery wheel 6 inches to 24 inches in diameter with a 4-inch suction pipe; an emery wheel 24 to 36 inches in diameter with a 5-inch suction pipe and every emery wheel larger than those provided for with a suction pipe not less than 6 inches in diameter. Such suction pipe shall be full sized to the main trunk suction pipe, and the main suction pipe to which smaller pipes are attached shall be equal in its diameter and capacity to the combined area of the smaller pipes attached to it. The discharge pipe from the exhaust fan connected with pipe or pipes shall be as large or larger than the suction pipe.

"They shall provide necessary fans or blowers connected with suction pipes, which shall be run at a rate of speed sufficient to produce a velocity of air in such suction or discharge pipes of at least 9,000 feet per minute to an equivalent suction or pressure of air equal to raising a volume of water not less than 5 inches in a U-shaped tube. All branch suction pipes must enter the main pipe at an angle of 45 degrees or less; the main suction or trunk pipe shall be below the emery or buffing wheels and as close to them as possible and be either upon the floor or beneath the floor on which the machinery to which such wheels are attached are placed. All bends, turns or elbows in such suction pipes must be made with easy smooth surfaces having a radius in the throat of not less than two diameters of the pipe on which they are connected.

"Nothing in this section regarding blowers, hoods, hopper, or suction pipes shall apply to emery wheels upon which water is used at the point of the grinding contact, nor shall emery wheels used temporarily for tool grinding or small shops employing not more than one man at work upon an emery wheel, which does not create dust enough in the opinion of the chief inspector of workshops and factories or a district inspector to be injurious to its operator. No female shall be employed in operating, assisting to operate, or using any of the wheels or belts specified in the preceding four subdivisions of this section.

"Whoever, being a person, firm or corporation, fails to comply with any provision of the preceding section, or fails to comply with such orders for changes as are issued by the chief inspector, within 30 days thereafter shall be fined not less than $100 nor more than $300 for each offense. All fines collected under this section shall inure to the benefit of the county hospital for tuberculosis. In prosecution for violations of this section by or under the direction of the chief inspector, such inspector shall not be required to give security for costs or adjudged to pay any costs. In cases where the accused is acquitted, the costs shall be paid from the treasury of the county in which such proceedings were brought."

OKLAHOMA.—No specific legislation.

OREGON.—No specific legislation.

PENNSYLVANIA.—"Be it enacted, etc., That all persons, companies, or corporations operating any factory or workshop where emery-wheels or emery-belts of any description are used, either solid emery, leather, leather-covered, felt, canvas, linen, paper, cotton, or wheels or belts rolled or coated with emery or corundum, or cotton-wheels used as buffs, shall provide the same with blowers, or similar apparatus, which shall be placed over, beside, or under such wheels or belts, in such a manner as to protect the person or persons using the same from the particles of dust produced and caused thereby, and to carry away the dust arising from or thrown off by such wheels or belts, while in operation, directly to the outside of the building, or to some receptacle placed so as to receive and confine such dust: Provided, That grinding machines upon which water is used at the point of the grinding contact shall be exempt from the provisions of this act; and, provided, this act shall not apply to factories or workshops where men are not employed continuously at such wheels or belts more than three hours in 24.

"It shall be the duty of any person, company, or corporation operating any such factory or workshop to provide or construct such appliances, apparatus, machinery, or other things necessary to carry out the purpose of this act, as set forth in the preceding section, as follows: Each and every wheel shall be fitted with a sheet of cast iron, or hood or hopper, of such form, and so applied to such wheel or wheels, that the dust or refuse therefrom will fall from such wheels, or will be thrown into such hood or hopper by centrifugal force and be carried off by the current of air into a suction-pipe attached to same hood or hopper.

"This act shall become operative on the first day of January, 1914.

"The inspectors of the department of labor and industry are hereby authorized to enter and inspect all factories and workshops, for the purpose of enforcing the provisions of this act.

"Any person or persons, or company, or managers or directors of any company or corporation, who shall have the charge or management of any factory or workshop, who shall fail to comply with the provisions of this act, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than $100 and not exceeding $300. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed."

RHODE ISLAND.—No specific legislation.

SOUTH CAROLINA.—None.

SOUTH DAKOTA.—None.

TENNESSEE.—No specific legislation.

TEXAS.—None.

UTAH.—None.

VERMONT.—None.

VIRGINIA.—None.

WASHINGTON.—"Every factory, mill or workshop where machinery is used, and manual labor is exercised by the way or trade for the purposes of gain within an enclosed room (private houses in which the employes live, excepted), shall be provided in each work room thereof with good and sufficient ventilation and kept in a cleanly and sanitary state, and shall be so ventilated as to render harmless, so far as practicable, all gases, vapors, dust or other impurities, generated in the course of the manufacturing or laboring process carried on therein; and if in any factory, mill or workshop any process is carried on in any enclosed room thereof, by which dust is generated and inhaled to an injurious extent by the persons employed therein, conveyors, receptacles or exhaust fans, or other mechanical means, shall be provided and maintained for the purpose of carrying off or receiving and collecting such dust."

WEST VIRGINIA.—No specific legislation.

WISCONSIN.—"All grinding, buffing and polishing wheels, except wheels where water is applied at point of grinding, must be equipped with a hood. The hood must cover the wheel in such a manner that it will carry off the dust insofar as the character of the work will permit. On grinding, buffing or polishing wheels 4 inches or less in width, the width of hood must be 6 inches. On grinding, buffing or polishing wheels over 4 inches in width the maximum width of hood must never be less than 2 inches nor more than 3 inches wider than the width of the wheel. The wheel must be measured across the face.

"The size of the suction pipe on hoods for grinding, buffing or polishing wheels must be as follows:

DIAMETER OF WHEEL.

6 inches to 10 inches,
10 inches to 18 inches,
18 inches to 24 inches,
Over 24 inches.

DIAMETER OF SUCTION PIPE.

3 inches to 4 inches,
4 inches to 5 inches,
5 inches to 6 inches,
6 inches.

"Where two sizes of pipe are specified above, the smaller size will not be permitted except in cases where the hood covers two-thirds of the wheel or where the work to be done is so light that the dust is easily exhausted.

"On all grinding, buffing and polishing wheels, the suction in the connection to the hood must be sufficient to displace a column of water in a U tube 5 inches. The test for suction with the U tube must be a static test and must be made in the following manner: A hole ⅛-inch in diameter must be made in the suction pipe approximately 12 inches from the connection to the hood. The rubber hose attached to the U tube must be placed over the ⅛-inch hole and the test made under these conditions. When the water in the U tube stands at 0, the 5-inch displacement is secured when one column of water rises 2½ inches above 0 and the other column of water falls 2½ inches below 0.

"All branch suction pipes must enter the main pipe in the direction of the flow of air and at an angle not exceeding 45 degrees, measured from a line drawn parallel with the current of air in the main suction pipe. On all grinding, buffing or polishing wheels, the main suction or trunk pipe must be placed below and as close to the wheels as possible, either on the floor or beneath the floor on which the machines are located.

"The dust discharged from any exhaust system must be taken care of by a dust collector, air washer or other adequate system which will prevent it from contaminating the air in or around the place of employment.

"All belts, drums, rolls or disks, used for grinding, buffing, polishing or sanding, must be equipped with an exhaust system so designed and attached that it will carry off the dust insofar as the character of the work will permit.

"All sand blasting operations, not performed under an enclosed hood, must be performed in a special room set aside for that purpose. This room must be equipped with an exhaust system which shall change the air in the room not less than four times per minute. The employer must furnish the employes who are working in sand blast rooms with a suitable covering for the face, which will protect the eyes, nose and mouth; such protector should be worn by the employe when working in the sand blast room.

"All tumbling barrels and rattlers must be equipped with an exhaust system, which will remove all particles of dust which are light enough to float in the air. All machines which create and throw off dust sufficiently light to float in the air, must be equipped with an exhaust system so designed and attached that it will carry off the dust insofar as the character of the work will permit."

WYOMING.—None.

Why Iron and Steel Corrodes

A Simple Explanation of the Causes of Rust, With Suggestions Regarding Its Prevention—Corrosion, a Problem in Conservation

BY JAMES ASTON

AT DELHI, capital of India, there has stood since A. D. 300, a pillar now famous in legend, in history, and in metallurgy; a solid iron column approximately 12 to 16 inches in diameter and 24 feet in total length, weighing about six tons. That such a mass of metal should have been possible of manufacture by the crude methods of the time, is in itself of interest; but that the shaft has resisted the ravages of weather and time for upwards of 1,600 years, is a fact so remarkable as to arouse the curiosity of the present-day iron and steel metallurgist.

Quick Corrosion

For within the past few years, we have noted the erection of steel stacks that collapsed because of excessive corrosion after less than a year of life; and farmers have complained so strenuously about the limited life of modern wire fencing, even though protected by a zinc coating, that the United States department of agriculture felt warranted in investigating the problem; and all appreciate that continual painting of modern steel structures is necessary in order to insure a suitable life.

In the rush for maximum production at minimum cost, in the race for tonnage records, we have been slow to recognize the problems surrounding the natural and inevitable decay of the material in service. Even the metallurgist had come to accept this as a matter of course, much as he would view, without alarm, the wear and periodical repurchase of a pair of shoes. "But," we are asked, "how about the Pillar of Delhi; the hundreds of specimens of ancient tools and implements in the Colombo museum, of an age of several hundred years; or the numerous other examples of iron in India of unquestioned ancient origin?" "Granted," says Mr. Metallurgist, "but please bear in mind that the examples cited represent merely the 'survival of the fittest'; that the rather limited number of well preserved specimens of authentic ancient origin are of compact, bulky character, and are compared with present-day materials of a form offering large surfaces to atmospheric attack; and that contamination of atmosphere, poorer quality of available raw materials of manufacture, and like factors, have militated against the product of the modern mill."

"However," persists our questioner, "there was recently torn down at Newburyport, Mass., a chain suspension bridge which had been erected for over 100 years, with links in a remarkable state of preservation, in spite of infrequent painting. Also, it is not difficult to cite examples of roofing materials in sheet form, which have had 40 or 50 years of life, and are good for many more, under service conditions which have compelled replacement of present-day sheet after a comparatively short life." "Oh, well," admits Mr. Metallurgist, "that may all be, but we are living in a practical age, and we can no more think of going back to the manufacturing methods of our grandfathers, than of making a transcontinental trip in a 'one-horse shay'."

Fortunately, the metallurgical world has been aroused from its lethargy, and is coming to recognize the corrosion of iron and steel as a vital problem in the conservation of our resources. The "Age of Steel" has been heralded as the era of indestructibility of structures; yet it is an open question whether or not the old wooden bridge did not possess greater durability than its modern steel prototype, if natural agencies are allowed to act. It is rather futile to speculate upon the life of steel; it may be as low as one year, or as high as 100 years. Certainly each of the above limits are extreme, and the average life may be put as considerably closer to the lower limit than to the upper, in spite of efforts at preservation by painting and protective coatings. An annual depreciation of 3 per cent, chargeable to waste by rusting, represents a yearly loss of approximately 1,000,000 tons of product, valued at $30,000,000 to $40,000,000 for the crude or semi-finished material alone, exclusive of correlated fabricating costs. And the loss is irretrievable, for while there is truth in the saying "From dust thou art, to dust returneth", and there is the full quota of iron in the dissipated oxide, it is unreasonable to expect a concentration of this by nature's forces, such as will render possible its recovery in workable form at some future period.

But this drain upon our iron resources does not represent the full measure of the tax which must be paid because of the persistence of iron in returning to nature. This fact may be justly claimed as the bulwark of the zinc industry, since 60 per cent of the spelter consumption of this country is for galvanizing iron and steel articles, or an annual outlay of $20,000,000 in an endeavor to protect the product from the inevitable decay. And what is the yearly value of paint and like products used for similar reasons? What about the 5,000,000 tons of coal needed in the production of the annual waste of steel, and the 1,000,000 tons represented in the spelter consumption? What is the value of the brass, bronze, copper, aluminum, nickel, tin and other metals and alloys used in machine parts, as sheathing, for plating, etc.; all finding outlet as protection or as substitution for steel in places where the latter would be used but for its lack of resistance to atmospheric attack? And finally, what is the annual sum of a more intangible nature, tied up in capital, labor, and material charges for construction in which steel forms a part, and due to the necessity for modified and more costly design, to lessened total life and consequent greater depreciation, and to heavier maintenance charges to guarantee even this more limited life; none of which would be necessary if steel possessed, in addition to its valuable features, the ability to withstand corrosion so as to assure us the full measure of these valuable properties for an unlimited term of service?

How Does Iron Rust?

Truly, there is logic in the statement that much of the utility of iron is in spite of itself. Abundance, ease of extraction, low cost, and valuable properties inherent and conferred through judicious alloying, are factors of sufficient weight to throw the balance in its favor, despite the inevitable decay through rusting.

How does iron rust? In the course of study and development, and among a number of hypotheses advanced, the metallurgical world has now come to a rather unanimous agreement regarding the progression of rusting under usual conditions, but is still divided into two factions or schools with respect to the inception of cor-

rosion. The "acid theory", advocated by Crace Calvert in 1871, and championed at present by J. Newton Friend, of England, is based upon the fact that carbon dioxide, or other gases, are prevalent in the atmosphere, and form with the moisture, an acid medium which will attack iron. Typical reactions are as follows:

$$2Fe+2CO_2+2H_2O=2FeCO_3+2H_2$$
$$2FeCO_3+5H_2O+O=2Fe(OH)_3+2H_2CO_3$$
$$2H_2+O_2=2H_2O$$

In other words, an infinitesimal portion of carbon dioxide, in the presence of atmospheric moisture, is sufficient to precipitate an infinite amount of iron as ferric hydroxide, provided there is sufficient free oxygen to convert the iron carbonate into the hydrate, and the liberated hydrogen into water, thus regenerating the active corrosion medium.

The Electrolytic Theory

This hypothesis is entirely rational, and was accepted without challenge until, in 1903, W. R. Whitney advanced the "electrolytic theory". The latter has since been advocated and extended in this country by W. H. Walker, A. S. Cushman and C. F. Burgess. If two strips of iron of identical character be dipped into an electrolyte, say a weak acid or other electrically conducting solution, and the external portions be connected through an electrical instrument, no appreciable current flow will be indicated. If for one of the iron electrodes, a strip of zinc be substituted, a current flow will be indicated, in the external circuit from the iron to the zinc, and in the internal circuit, or through the electrolyte, from the zinc to the iron. At the same time, it will be observed that the zinc goes into solution, and that gas bubbles begin to collect on the iron surface. Replace the zinc electrode with one of copper, and like phenomena will be noticed, but with reversal of effect; that is, the external current flow will be from the copper to the iron, internal from iron to copper, with solution of iron and gas accumulation upon the copper surface. We have formed a galvanic battery, with generation of electric current at the expense of chemical disintegration of the electropositive element, zinc in the one case, iron in the other.

Such action, however, is not continuous. As the electropositive element goes into solution, its quantitative electrical equivalent must be pushed out of the electrolyte, to maintain the electrical balance of the solution. In general this is the hydrogen, which is driven to the electronegative element, or cathode surface, and there gives up its positive electrical charge, promoting the flow of current, provided external electrical connection is made. But this flow soon stops the so-called polarization phenomenon, due to the deposition of the hydrogen film upon the cathode. Continuity of current is insured by depolarization, generally effected by oxidation of the hydrogen to form water.

Factors Insuring Electrolytic Action

For generation and continuance of electrolytic action, certain factors are essential, namely: Two dissimilar electrodes, each of which must be an electrical conductor; an electrolyte; a metallic connection external to the cell; and a depolarizer. Steel subjected to the weather presents the necessary factors. The heterogeneity of surface, chemical or mechanical, furnishes the electrodes of dissimilar character; the moisture of the air, in its native state or made more active because of dissolved carbon dioxide, sulphurous, or other gases, is the electrolyte; the electrical circuit is completed by the contact of the electrode spots in the body of the steel; while the oxygen of the air insures depolarization and continuity of action. Electrolytic action must proceed if all factors are present; it will cease if any one is withdrawn. At points where the iron forms the anodic electrode, it will go into solution, be converted immediately into the hydrate, and be precipitated upon the surface as such, to be subsequently converted to the familiar hydrates or oxides which are more commonly called rust.

There has come to be a fairly generally recognized acceptance of the electrochemical theory of corrosion. While we have the controversy between the adherents of the "electrolytic" and "acid theory" schools, this is largely one of technicalities regarding the inception of rusting, and is also concerned particularly with the beginning of corrosion of pure iron in pure water and pure air. All recognize that in actual service, we are dealing with acid conditions in the corrosion medium, and there is the probability of the inception and the subsequent progression of rusting because of acid action; and that we have in general some heterogeneity in the iron and steel, enabling the corrosion to begin and to proceed because of galvanic action. And regardless of the particular theory to which we may incline for an explanation of the beginning of rusting, we must grant that such rusting will begin; for even the most radical adherents of the electrochemical theory contend that corrosion begins because of the solubility, even though slight, of pure iron in pure water, and because of some ionization of water, however pure it may be.

The two dissimilar electrodes necessary for the galvanic action may be the result of chemical heterogeneity in the metal; that is, the iron may be associated with other elements of an electrically conducting character, and these may exist in the mixture as separated individuals. If they are electronegative to the iron, the latter will go into solution in the presence of the necessary moisture and air. Unfortunately, too many adherents of the electrochemical theory stop at this point in their application of its principles. That heterogeneity which is essential for the formation of two electrodes may be chemical, as stated above; but it may also be the result of physical conditions. An important factor in this respect is the effect of straining or distortion of the metal, or like physical non-uniformity due to manufacturing conditions. And with the strained metal electropositive to the same metal unstrained, we can have galvanic action set up in any sample, due to this cause.

But of even greater significance is the heterogeneity of surface condition. To illustrate—two bars of similar steel may be inserted into a beaker of water, and air bubbled through; there will be no appreciable difference of potential set up. But if one of the bars is wrapped with a few thicknesses of cloth, and the experiment repeated, there will be a very appreciable electromotive force set up between the two bars. The covered rod will be electropositive and will therefore corrode. In other words, the mere prevention of access of oxygen to the surface of one of the rods, by a medium porous enough to allow contact of the rod with the electrolyte, has served to bring about electrochemical action.

Moisture of the Breath

Again, observation by means of the microscope of the disappearance of the moisture of the breath from the polished surface of a piece of iron, has disclosed the fact that instead of evaporation as a uniform film, the liquid forms a series of globules or drops, and each of these disappears by contraction towards a center or nucleus. The metal surface has now become studded with a multitude of minute specks, due to the concentration at the center of each drop of any dust particles, or more probably of the rust which has formed in the brief interval of time. Further observation of the speckled surface has shown that the minute spots are the nuclei in the progression of the rust; some of the spots grow rapidly, others very slowly; and often there is a merging

into larger patches. But it takes a very long time for the entire surface to become coated, and even then there is great irregularity in the thickness of deposit.

We have the old adage "rust promotes further rusting". The usual explanation is that the rust is an electronegative constituent in its relation to the surrounding or underlying iron, and on this account there is a solution of the iron provided we have the necessary accompaniment of moisture for the electrolyte, and air for a depolarizer. While there may be some galvanic action of this character, it seems entirely probable that an effect of greater magnitude is the result of causes mentioned above. That is, each particle of rust forms a medium porous enough to hold the moisture in contact with the underlying iron. but at the same time furnishes a covering sufficient to prevent the free access of the oxygen of the air; and the rusting proceeds because of the electrochemical action between the covered and uncovered portions of the metal. The increased volume occupied by the rust, results in a gradual expansion of each spot, with the final merging of several of them into a larger patch. At the same time, each spot of rust may form a nucleus for a steady deepening of the corrosion penetration into the body of the iron—the well-known pitting effect.

How Can Rust Be Prevented?

What measures can be taken to arrest or retard the corrosion? There is a well-founded supposition that the old-fashioned wrought irons offered greater resistance than the modern steels, and that our troubles really began with the invention of the bessemer process in 1856. This granted, it was but natural to charge the deterioration to the chemical elements differentiating the new from the old process. The chief detectable variation was manganese, practically nil in the old wrought irons, and present to an appreciable degree in the usual steels, as a necessary addition to effect proper deoxidation of the bath and to neutralize the otherwise harmful physical effect of the sulphur. The argument was put forth that manganese in present-day steels is the cause of excessive corrosion, especially because of the formation of manganese sulphide, its tendency to segregate and cause heterogeneity, and its electronegative character in relation to iron.

While this theory has gained a very considerable recognition, its logic is not above criticism. A normal steel carrying 0.05 per cent of sulphur will require approximately double this amount, or 0.10 per cent of manganese for the formation of manganese sulphide. The total amount is certainly small for the marked effects it is supposed to cause. The remainder of the 0.40 to 0.80 per cent manganese of ordinary steels, is held in solid solution in the iron, and as such should be of little influence; and particularly of no detrimental effect, since manganese is electropositive to iron. Furthermore, the experiments of Cobb (Iron and Steel Institute, 1911) indicate that manganese sulphide is a non-conductor of electricity, or only feebly conducting, and granting this, its effect as one electrode in a galvanic couple with iron, should be extremely slight in causing corrosion of the steel.

It is probably not reasonable to say that manganese is without influence on the corrosion of iron and steel. It seems rational, in view of the well-known tendency for the sulphides to oxidize in the presence of air and moisture, that any manganese sulphide in steel will undergo decomposition, and have a double effect on the corrosion. The sulphurous acid will make the electrolyte more actively conducting; and the manganese oxide or hydrate will cause the heterogeneity of surface, with an effect entirely similar to that cited previously with regard to iron rust.

Through too ardent adherence to one phase of the electrolytic theory of corrosion, and in the attempt to explain differences in dust resistance to chemical heterogeneity, the physical differences of the old irons and the new steels are oftentimes neglected. All wrought irons contain a small amount of mechanically entrained slag, of a glassy character and inert electrochemically, which is elongated in a multitude of scattered microscopic filaments during rolling, and probably in addition is also present as films hardly detectable by the microscope, surrounding the fibers or grains of iron. Is it not reasonable to expect this slag to act as a barrier to the progression of corrosion; that more and more of the exposed surface becomes of a glassy character, as the overlying iron is corroded away? Such an effect is observable in the case of cast iron; although the graphite particles are electronegative to iron, and should thus hasten the corrosion, this very solution of the iron exposes more and more of the graphite, and thus progressively arrests the effect by covering the underlying iron.

Heterogeneity of material, by exposing iron to elements of an electronegative character, should be a factor of detriment from the standpoint of corrosion. Again, based upon the argument of covered and uncovered spots, even though such surface impurity, inclusion or defect be electropositive to iron, and thus goes into solution and nominally protects the iron, the solution products may be of such character that the expected protective action is outweighed, and acceleration of corrosion will actually result. The only condition is that the surface covering material be porous enough to allow of contact between the electrolyte and the underlying iron.

Ingot Iron

There has been developed within recent years, by some modifications of basic open-hearth furnace practice, a type of ingot iron of extraordinarily high purity. The total content of impurity is entirely negligible, and, based upon the reasoning that segregation is thereby reduced to a minimum, it is being advocated for its weather-resisting quality. Certainly chemical heterogeneity should be practically eliminated, and it is reasonable to expect, also, that absence of segregation and uniformity of product should result in better physical homogeneity in rolling. Again, the extreme care necessary in the manufacture of this pure product should be beneficial for the same reason. Thus there should be some advantages in purity of material.

But no material is immune from the inception of rust; and once begun, the inevitable progression must result. What is the proportional part in the total corrosion to destruction, which is due to the rusted surface itself? If small, purity is a factor of considerable importance; if, as is not unlikely, the rusted surface soon becomes the preponderating influence, then purity is only of initial significance, and moves more and more into the background as this second factor comes into play. No doubt the relative effects are influenced by varying conditions, such as place of exposure, seasons, time and the like.

Alloying as a means of augmenting the weather resisting properties of steel, also seems a logical method of attack. Nickel additions are of marked advantage. But the use of even a few per cent of this element adds too much to the cost to be warranted for general use in view of the rather limited benefits known to accrue; while an addition of 15 or 20 per cent, even though it results in a product of extreme resistance, is so costly and so modifies the usual physical properties of the steel, that it is at once banished from consideration. And many other possible alloying metals fall in this category.

Within the past few years, copper

bearing steel has come into the limelight. The amount of this element is small, 0.20 to 0.30 per cent, and yet the claims for lessened corrosion seem to be well founded and substantiated. The claims are combated by some, on the ground that the electronegative nature of copper with respect to iron, should make it an accelerator, rather than a retarder of corrosion, in the light of the electrolytic theory. This stand would be well taken provided the added copper existed in the mass of iron as distinct or isolated particles. As a matter of fact, copper up to a few per cent is held in solid solution in the iron; homogeneity of structure is the result, and the individuality of the copper becomes lost or merged with that of the iron. There should be no greater susceptibility to galvanic action than with pure iron itself.

The reasons for the protective effect are not definitely known. It may be that there is some lowering of the solution pressure or electrical potential as compared with iron. Or perhaps, as solution does occur, there is a precipitation of the copper as a thin, metallic film over the entire surface, which protects so long as it is intact, and which automatically renews itself in case of abrasion.

Other elements may occupy a position analogous to that of copper; small amounts may be of considerable influence in inhibiting corrosion. To the contrary, silicon and arsenic in small proportions seem to have an accelerating effect. It is not improbable that part of the stability of the ancient irons is due to their high phosphorus content, as well as to the appreciable amounts of copper found in many of the samples. Their freedom from manganese may likewise be one of the factors; its comparative magnitude is an open question.

Since corrosive attack begins only through exposure of surface, it is but natural that surface coatings should occupy a most prominent place in our efforts at preservation. A most fruitful field of investigation lies in the production of an oxide or other surface condition of the iron, which will eliminate some one factor essential to electrolytic action. Zinc, for example, oxidizes upon exposure with extreme rapidity; fortunately the resulting oxide is firmly adhesive, is impervious to moisture, and is electrically non-conducting. Thus the necessary condition of a completely conducting circuit is eliminated, and further corrosion is arrested because of stoppage of current flow. Unfortunately, oxidation of iron by natural agencies results in compounds which hasten, rather than impede the action. The iron rust absorbs the moisture like a sponge, and prolongs the galvanic action by slowing down its disappearance by evaporation; this in addition to the direct accelerating influences mentioned earlier in this article. By heat agencies, the impervious black oxide is formed. This is protective so long as it lasts; but scratching or abrasion allows attack to begin; in fact, rather hastens it because of the conductive and electronegative character of the oxide. And the spread of the red rust soon undermines the artificial coating.

It would indeed be fortunate if means could be devised whereby the black oxide would be automatically renewed in case of scratch or abrasion, thus preventing continuity of electrochemical action. It is not unlikely that the passivity of iron resulting on immersion in strong nitric acid, is an effect analogous to the above; and that development of some natural process of passivifying would be a big step in the direction of solution of our problem.

Purely mechanical methods may do much in effecting a beneficial surface condition; Russia iron is an example. Such effect, however, can hardly do more than arrest the action, since the feature of natural renewal is improbable. But the retardation may be indefinitely prolonged; in fact, some authorities contend that one of the factors in the long life of the Pillar of Delhi is the surface patina or film resulting from methods of manufacture. And reworking of certain old-time and resistant materials, has destroyed a large measure of their stability in subsequent test.

Applied coatings are most numerous, but fall into two principal subdivisions, nongalvanic and galvanic. Paints, lacquers, etc., are in the former class, although their particular chemical nature may result in some inhibitive or accelerating influence. In general, the protective effect is largely mechanical; a removal of one essential factor by reason of the insulating and impervious character of the paint film. Once the coating is abraded to the extent of allowing contact of the moisture with the iron, conditions for continuing galvanic action are restored.

Tin Plate

Where the applied coating is of an electrically conducting nature, electrochemical principles play a part in the resultant effect. So long as the coating is intact, the inhibition of corrosion is purely mechanical and differs in no respect from that of a paint or other inert film. Remove part of the coating, and expose the underlying iron, and immediately the two metals in conjunction with moisture, set up a galvanic couple of marked activity. Should the coating be electronegative to iron—for example, tin — acceleration of corrosion results in the damaged zone. Tin or terne plate, therefore, is immune from rusting only while the coating is mechanically perfect. Zinc, on the other hand, is electropositive to iron; therefore, even though the coating be abraded, the iron is protected at the expense of solution of the zinc, to the limit of its zone of influence in the galvanic couple formed.

The problem of corrosion would appear to be possible of solution. Why not analyze the Delhi column, or known examples of marked resistance? Chemical constitution, however, is but one of the important factors. Physical characteristics are of equal significance, and many of these are not such as are revealed by microscopic examination. Again, why not test the various materials, and reach a solution by cut and try? Fortunately, technical societies, manufacturers, and individuals are co-operating to a greater extent than heretofore, and results of increasing value should be expected in the future. The difficulties, while by no means insurmountable, are not to be considered lightly. Time is the all important factor, and years are needed to reach conclusions of incontestable character.

Again, such conclusions must be backed by consistency in a multiplicity of tests, and under the varying conditions of actual service; conditions modified by form of product, by time, seasons, location, weather, humidity, atmosphere, soil, water, etc. It may be truly said that no one material is best for all conditions, and it is indeed unfortunate that accelerated tests of a satisfactory character are not at hand to enable accurate conclusions to be drawn in a moderate period of time.

The metallurgical world is not idle, and the fact that it is thoroughly aroused to the importance of the problem is in itself significant. That conversationist is the more spectacular who preaches the doctrine of less waste of our raw materials and a less prolific expenditure of our resources; but is there not equal merit in the effort to conserve that which has represented not alone raw material, but human energy and capital expenditure in production and utilization? Is rustless iron an illusion or a mirage; a fit companion of that will-o'-the-wisp of metallurgy, the hardening of copper? The Pillar of Delhi is a fact, and should be sufficient incentive to spur the metallurgist to further effort toward the goal of attainment.

Fig. 1—Pump Runners are Cast in Heavy Dry Sand Cores

Fig. 2—Pump Runner Being Machined on a Boring Mill

Interesting Steel Casting Plant

Extensions and Improvements Recently Have Been Made to the Dutcher Works of the Prime Steel Co.

SOME interesting improvements recently have been made to the Dutcher works of the Prime Steel Co., Milwaukee. The main foundry building, which is 70 feet wide, has been extended 92 feet making the total length 476 feet. The building is of brick and tile construction. A mold drying oven, 20 x 24 feet, with 12-foot headroom from top of truck to ceiling, has been erected. It is equipped with a steel door operated by an air lift, thus eliminating hand labor. The oven is coke-fired from the rear and is equipped with a Hoskins registering pyrometer which insures accurate temperature control. Two tracks are provided for the four trucks which may be used in the oven.

A reinforced waterproof concrete molding pit 14 feet wide, 36 feet long and 8 feet deep is utilized for handling heavy work. The bottom and side walls of the pit are 24 inches thick and the ends are 18 inches in thickness. Temporary partitions are

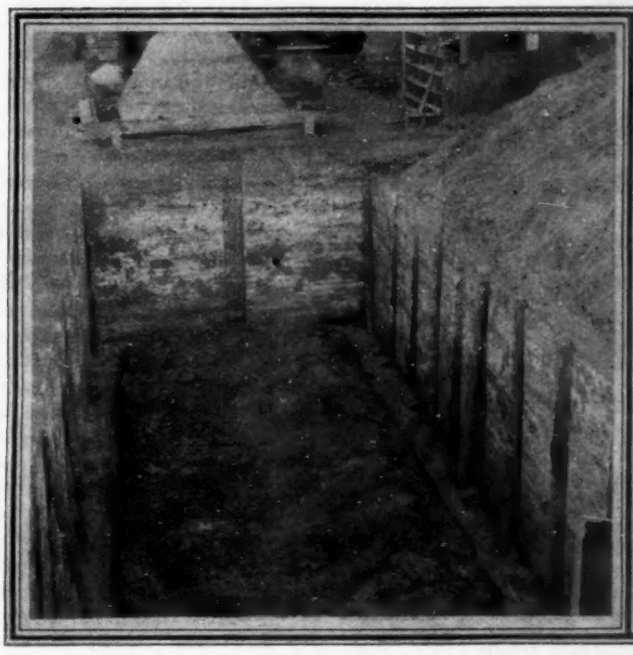


FIG. 3—CONCRETE LINED, WATERPROOF MOLDING PIT

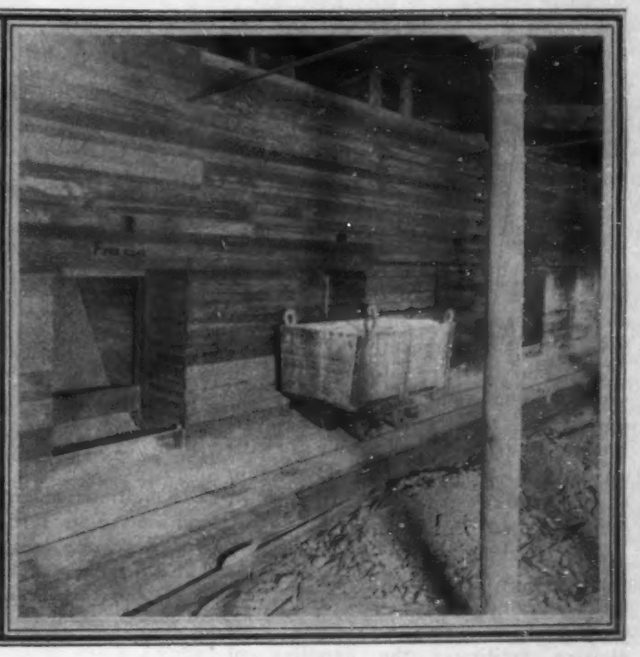


FIG. 4—SAND AND CLAY STORAGE BINS

FIG. 5—SKELETON PATTERN USED IN MOLDING CONVERTER TOPS—CORE IN BACKGROUND

FIG. 6—CONVERTER TOP CASTINGS

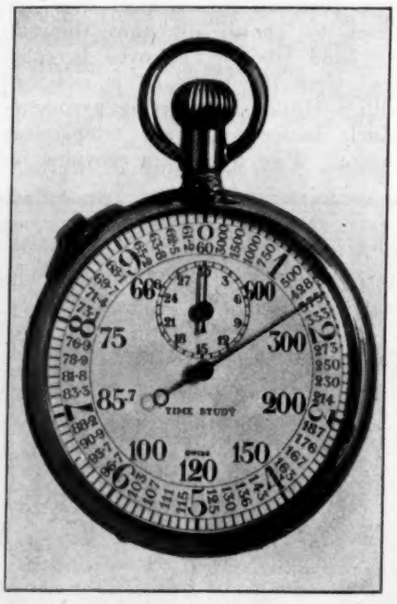
used to divide the pit into sections for small work. These partitions fit into slots which are spaced on three foot centers along each side of the pit. Slots also are placed at each end of the pit, thus permitting it to be divided longitudinally through the center.

A new annealing oven 12 feet wide, 14 feet long and 8 feet high has been erected. It is oil-fired and the doors are arranged to slide horizontally. They are operated by hand. A 500-ton hydraulic straightening press has been furnished by R. D. Wood & Co., Camden, N. J. It is controlled by a single lever and is manipulated by a laborer.

The molding room is provided with two jolt-iam rockover pattern drawing molding machines furnished by the Davenport Machine & Foundry Co., Davenport, Ia. They are rated at 500 to 1,500 pounds capacity, respectively, and supplement an Arcade 16,000-pound jolt ramming machine which has been in service for some time. Three new Tabor machines and nine squeezers for small work also have been added recently.

The bins for the storage of core sand, molding sand, clay, etc., were designed by the company's engineer. They are arranged alongside a hallway which is roofed over. Each bin has a capacity of two carloads of either bagged or bulk material.

Two cleaning rooms are provided. They are located at opposite ends of the shop and one is used for small work and the other for large. This division facilitates the handling of both classes of castings and increases the probability that the work will be shipped on time. Both cleaning rooms are provided with sandblast equipment, tumbling barrels, sprue cutters, cold saws, electric and acetylene welding apparatus, etc. The Dutcher works of the Prime Steel Co. produces open-hearth steel castings exclusively and the melting equipment consists of two oil-fired acid furnaces of 10 and 15 tons capacity, respectively.



TIME STUDY WATCH

The accompanying illustrations will indicate the varied character of the work handled at this plant. Fig. 2 shows a set of centrifugal pump runner blades being machined on a boring mill. These blades are cast separately in cores, as shown in Fig. 1. Three cores are employed, the two side pieces being bolted together by an extra heavy arbor, as shown in the upper left hand corner of Fig. 1.

Time Study Watch

To meet requirements of time study in shop work a special stop watch has been devised with a decimal dial on which the minute is divided into tenths and hundredths. This has the effect of facilitating computations to a degree not possible with the ordinary watch. The dial also contains figures spaced 0.02 minute apart which indicate at any point of elapsed time the corresponding output per hour. This is a convenience when using the watch on punch press, drop hammer, screw machine and similar devices.

As an illustration, let it be assumed one operation is shown by the watch to consume 0.76 minute, the hand shows by the figure under it that the output per hour at that rate is 78.9 operations. Had the hand stopped at 0.36 minute the output would be shown to be 167 per hour. In case of unusually short motions it is customary to time ten operations and add a cipher to the reading showing output per hour. Thus if the time for ten strokes of a press is shown to be 0.44 minute, the number per hour will be read as 136 and adding a cipher will give 1,360 as the true number per hour. Exclusive sales rights have been placed in the hands of M. J. Silberberg and associates, Peoples Gas building, Chicago.

How to Break Up a Bad Habit

Plain Talk by an American Steel Manufacturer on What Industrial Independence Really Means

BY DANIEL WELLS

A THOUSAND and one things produced in this country depend upon Europe for some part of their make-up. We now hope this is going to be different. You might say Uncle Sam's automobile is largely an assembled car, parts coming from many European countries. Is it not time we put a stop to this assembling business and produced our own parts? We are big enough and old enough to know how. Why should we, rich in every resource, borrow so from our neighbors?

Drawing upon half-civilized Europe has been merely a life-long habit. There's no good reason for it. Let's look our own equipment over now and see what we can do for ourselves. The war, acting as a strike, has called out all the hands over there and no one knows when they will be back again to fill our orders. When they do resume, think of the long, slow, cheerless months before they regain the momentum lost through this fiendish destruction of lives priceless to industry. It will take generations to reproduce those men who put Europe on the industrial pinnacle. Slow, careful growth and study is the only process that can produce such intellects. The human spark of industrial genius is all too rare to spring into sudden being because war wastes the supply.

You are an American manufacturer. It has taken you a generation, say, to develop that efficient factory force of yours. Suppose you were to gather them all in, from manager down, and send them off as raw material to the battle front. War throws them back to you, its finished product, one-half killed, the other half crippled for life. How long would it take you to rebuild yourself with you and your whole country beset with these conditions?

America to the Front

HERE'S where America comes to the fore. That's your advantage, Mr. Pittsburgh, Mr. Chicago, and Mr. Detroit. What are you going to do with it? You hesitate. You discuss. It's like robbing the dead? Perhaps. But the world will be fed and clothed. Are you going to do your part, or is someone else?

A self-made business begins in a very humble way to produce within itself as far as it can its finished product. At the start, buying a large part of its ingredients from others, it is satisfied so long as it places upon the market the finished result. As it gains headway its thoughts turn more to self-improvement and step by step it gathers to itself those parts formerly furnished by others. The end of this road is complete mastery of its own process, industrial independence.

As grows a factory, so has grown America. We began with our thin line of mills along the New England seaboard, visible from a vessel's deck. This was the ragged edge of an ever-widening industrial zone. Those queer little Quaker shops imported everything thinkable from the mother country. There was no choice, the mother country expected it of them and in those days they had to listen well to the strong voice across the water. Their own resources were just in the crude awakening.

Gradually this thin, black line of industrial smoke began to flow inland. As those chimneys stalked farther and farther westward, greater and greater became distance and freight, more and more we learned to see our own resources until now it is a national conceit that we are commercially independent and supreme in our chosen lines. Now comes a general war. Our eyes are opened. We stand aghast. Our favorite fallacy explodes with a crash. The merchant marine of the whole world loses its head and scuttles for cover. The seas in a week are stripped nearly bare of merchant bottoms. Behold our national conceit whipped to rags. So we stand today. All these years we simply have followed the easiest road, buying our parts ready-made. Now the closet door is open. There grins our family skeleton: Foreign Dependance. We had always told ourselves our marvelous American genius had put us in a class that was solitary. What a smug self-sufficient idea to hold of ourselves.

Needed Introspection

AMERICAN industry from steel to potash today hastens guiltily to cover its trail. Our gaze turns inward upon ourselves; we are estimating our own facilities in a way we never have done before.

Thomas Edison used a ton of foreign carbolic acid a day on his discs. The war cut this off. He at once looked up methods for making this acid and now produces all he needs. Europe will never see his acid trade again. This is happening in many lines.

If America leads the world in steel, why should the fellows across the water supply us our ferro-manganese? Our iron hills and dales are as numerous and as fertile of deposits as theirs. If we search ours as closely as they search theirs, we would find what they have found. We have not worked our land as closely as they have theirs. We simply have not felt the whip of necessity.

Rails vs. Toys

PERHAPS you are an operator or merchant in iron and steel. Why should you work all day in this country producing steel, then go home at night to watch your little ones at their toys of German metal? Is that logic or self-respect? Why freight that German product across sea and land to your home when your own country abounds in it, and you could spend your days turning it out? German hand labor is cheaper, you say? Very well, let's look at that side a moment. When you travel in this country, do you travel over German rails? Rather not. Why? American rails are cheaper. Why? Because in this country nearly all hand labor is eliminated in their making. Very good. Now, then, does not the argument apply generally? Why not reduce the hand labor element in toy-making and give our children American toys? We did it with rails, we can do it with toys. Besides, come closer and get this for certain—you can't get the foreign article now, all that hand labor has gone off to war and may not return. So invoke your inventive genius or go without. Dire need always compels an answer.

If we find a way to furnish our own supplies, how long will this question stand answered? When the war is over, will not the Europeans come clamoring for their old trade channels again? Yes, but it will be useless. They will be too late for the party

(*Continued on page* 440b.)

The author, Daniel Wells, is vice president, Detroit Seamless Steel Tubes Co., Detroit, Mich.

Paste for Measuring Temperature

A new method for measuring temperatures has been developed by the Carl Nehls Alloy Co., Detroit. This consists of the use of different kinds of metallic salts which are made into molecular mixtures that will melt down at different temperatures, throughout the range between 220 and 1,330 degrees, Cent. Practical means have been devised for using them in place of pyrometers. They also are useful for checking pyrometers. In this case a cylinder of paste is placed at the end of the thermo-couple and when it melts the pyrometer should read the same as the temperature indicated by the paste.

One method of using the paste is to cast it into solid cylinders, $\frac{7}{16}$-inch in diameter and ¾-inch long, as shown at

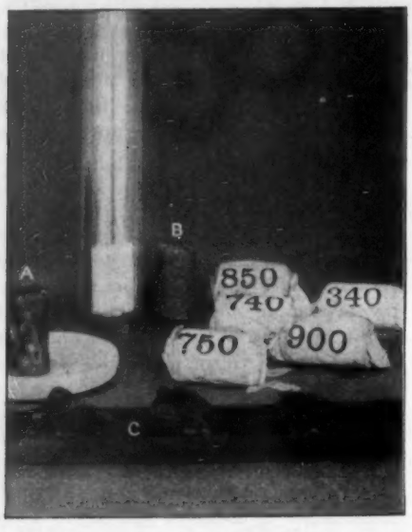


FIG. 1—CYLINDRICAL PASTE PYROMETERS

A and *B*, Fig. 1. Each is wrapped in a paper, on which is printed its correct melting temperature in degrees Cent. For all temperatures below 932 degrees Fahr., these cylinders can be inserted in an air-tight glass tube, shown at the center of Fig. 1. The salts then can be used over and over again. By using small porcelain saucers, the salts will not waste and can be used repeatedly, as they melt each time the temperature rises above the one marked on the cylinders and become solid again the moment the temperature falls below this degree of heat.

These salts also are sold in the form of a paste. A sufficient amount to make several hundred determinations is packed in tin cans. Pastes with varying melting temperatures can be daubed along a steel bar, as shown at *C*, Fig. 1, and this can be inserted into furnaces, ovens, retorts, flues, gas mains, steam pipes, etc., to find the temperatures at which they are operating. The temperature will be between the salts that melt and those that remain solid. By using a long bar one can determine whether the temperature is uniform in the front and back, top and bottom, or corners of a furnace, oven, kiln, etc.

To ascertain the exact temperature of tools heated in a forge fire, a paste is selected that represents the correct hardening temperature for the tool. This is daubed on the tool and when it is heated to this temperature the salt will melt and the tool can be taken out of the fire and quenched.

Another method of using these cylinders is shown in Fig. 2. At *A* are two tubes or pipes with plugs in their ends. Cylinders of different melting temperatures are dropped into the tubes and rods *B* are set on top of these cylinders. When the salts melt the rods will lower. When one rod is lowered and the other remains stationary, the temperature must be between the melting temperatures of the two salts chosen. These may be only 10 degrees apart. This method is useful for finding the temperature of molten metal, salt bath furnaces, etc.

These molecular mixtures of metallic salts can be used for ascertaining the temperatures of molten, cast, rolled, forged or heat-treated metals; in baking, enameling, japanning and other ovens; in distillation retorts; for flue, chimney, producer and other gases; for gas engine exhausts, etc.

Multiport Valves

A booklet of 72 pages has been issued by the Harrison Safety Boiler Works, Philadelphia, describing a line of multiport valves for back pressure, relief and vacuum service, for flow service in connection with mixed flow turbines, and check valve service with bleeder or extraction turbines.

The essential idea of the multiport valve is the use of a number of small disks instead of one large disk, in order to secure greater safety, quietness, lightness of moving parts, and tightness. The several disks are each fitted with an independent dash pot held to the seat by independent springs, the tension of all the springs being adjusted simultaneously by a pressure plate, the position of which can be changed by means of a hand wheel on the outside of the casing. There are no parts directly connected to the disks themselves which extend through the casing. Another advantage claimed is the ability to adjust the back pressure quickly and easily by changing the position of the pressure plate, which may be done from a distance, by means of chain or rods.

For vacuum service the construction is practically the same, except that provision has been made for water sealing.

For flow service with mixed flow turbines, balance pistons are connected to the disks in such a way that the latter will not open except when the pressure in the exhaust steam pipe is greater than the atmosphere. It is thus impossible, where one of these valves is used, for vacuum from the turbine to back up into the engine exhaust line through leaks or piston rod or valve stem packings. The multiport check valve is designed for use with extraction or bleeder turbines, to prevent reverse flow and consequent over-speeding of the turbine. In addition to full descriptive and tabular matter, the book contains numerous diagrams and layouts, also data on the effects of air in condensers and upon turbine performance.

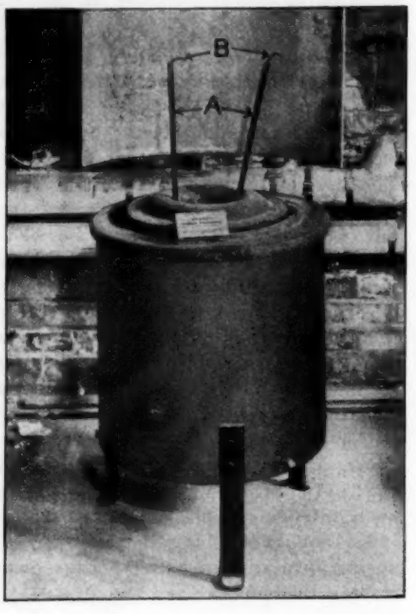


FIG. 2—PASTE PYROMETERS USED IN TUBES IN A FURNACE

The Wayside Inn at Sudbury, of which Longfellow wrote, was built in 1686. Repairs were made recently and some of the original clapboards were removed. The wrought iron nails holding the boards in place were found to be in almost perfect condition, although they had been in an exposed position for 228 years. A careful analysis of the nails indicated that they were almost pure iron; only the faintest traces of carbon, manganese, copper or sulphur could be detected.

More Time

Will Probably be Requested by Armor Plate Committee

Washington, Feb. 23.—Senator Tillman, chairman of the committee which recently made an investigation as to the feasibility of the government building its own armor plate plant, told *The Iron Trade Review* recently that the committee has practically completed its preliminary report to be submitted to congress. It may be sent to congress at the present session, as is required by the act authorizing the investigation, he said, although consideration is being given to a plan to have congress authorize extension of the time so that it will not be necessary to make the report until at the next regular session, beginning in December. Senator Tillman seemed inclined to the belief that extension of time would be sought.

Secretary Daniels, of the navy department has written a letter to the senator suggesting that it might be well to extend the time, basing his contention on the fact that the European war has prevented the committee from securing information as to armor plate manufacture in foreign countries.

After stating that he "thought it would be found that the committee will recommend that the government build an armor plate factory," Senator Tillman said no appropriation for the project would be asked of congress at the present session. The condition of the treasury, he said, would not justify such a request at this time.

Delay in compiling the preliminary report, it was stated by the senator, has been occasioned by the fact that summaries of evidence obtained which had been submitted to witnesses were slow in being returned.

Senator Tillman said that information from sources other than those associated with the three armor making companies is being sought in this country, but as yet no effort has been made to obtain data from abroad. It is not known at this time, he asserted, that any will be asked from manufacturers in foreign countries, the senator intimating that all facts desired may be obtained in this country. He said the committee hopes to be able to furnish considerable material that has not been published. The report, aside from giving summaries of evidence gathered, is expected to deal at length as to the cost of manufacturing armor, the processes employed, the equipment used by each company, and related data. No diagrams of the plants will be incorporated in the report, however. The senator made no comment other than that heretofore made as to what capacity he thinks the government plant should be, where it should be situated, and its equipment. Shortly after making the visit to the three plants, he indicated the plant should have a capacity of 10,000 tons per year, should not be situated near the coast, and that pig iron should be purchased in the open market, thus doing away with the necessity of building a blast furnace.

National Metal Trades Convention

Preparations are under way for the seventeenth annual convention of the National Metal Trades Association at the Hotel Astor, New York, April 14 and 15.

The executive committee will hold its session at 3:30 p. m. Monday, April 12. Tuesday, the secretaries' breakfast will be served at 8 o'clock. The administrative council will meet at 10 o'clock and at 12:30 noon luncheon will be served for local presidents, secretaries and the administrative council. Tuesday evening at 6:45 the alumni banquet will be served.

The first session of the convention proper will be called to order at 9:30 Wednesday, April 14, and the convention banquet will be served that evening at 7 o'clock. The final session of the convention will be held Thursday morning with adjournment at noon and Thursday afternoon at 2 o'clock the incoming administrative council will hold its first session.

Details of the convention sessions are being outlined and papers prepared, announcement to be made later.

Edison on a War Lesson

Thos. A. Edison announces that the plant for the recovery of benzol which he is erecting in connection with the by-product coke works of the Cambria Steel Co. at Johnstown, Pa., will be in operation March 1. "We will be getting benzol from a plant at the Cambria Steel Co.'s works by March 1," said Mr. Edison. "This war is giving us a lesson in getting these things at home. Why, the United States has been throwing carbon away. I will have two more plants running when I pass on some options now before me. Lots of men are thrown out of work just because we depended on Europe for things we should have gotten ourselves.

The G. Garrigus Machine Co., Bristol, Conn., has extended its working hours until 9 o'clock at night and the company contemplates adding a night shift.

Ruled Out

Was Bill to Prohibit Exporting of Nickel—New Tariff Pleases

Toronto, Feb. 23.—The bill introduced in the Canadian Parliament by W. F. Maclean, of Toronto, prohibiting the exportation of nickel to foreign countries during war time, was objected to by Premier Borden on the ground that, being a measure affecting trade and commerce, it should have been recommended by a committee of the whole. The premier's objection was sustained by the speaker and the bill was ruled out of order. As the present session will be a short one and devoted specially to war measures, it is doubtful whether it can be re-introduced.

The new tariff is generally warmly approved by the iron and steel interests. President Plummer, of the Dominion Steel Corporation and President Robert Hobson, of the Steel Co. of Canada, both expressed their satisfaction with its provisions, as likely to encourage home manufacture. Agricultural implement manufacturers, however, are not so well satisfied and consider the exemption of agricultural machinery of the most important lines as unfair to their interests. Bridge builders who import large quantities of structural steel are adversely affected by the increase.

The largest shipment of motor cars and carriages ever made by a Canadian factory took place last week, when the McLaughlin Carriage Co., Ltd., of Oshawa, shipped a train of 45 carloads of autos and carriages over the Grand Trunk railway to Winnipeg and other western points. This is regarded as a highly encouraging sign of improved business conditins in the west.

C. R. Burt, factory manager of the Russell Motor Car Co., of Toronto, has been appointed assistant general manager and elected a director in succession to J. E. Rogers, who recently resigned.

The American Spiral Spring & Mfg. Co., Pittsburgh, is making a number of special springs for the battleship Pennsylvania. The springs are of extra heavy section steel, and will be used for the balanced hatch covers on the vessel. The company also is manufacturing a lot of springs for the Rock Island Arsenal, Rock Island, Ill.

The Warren Tool & Forge Co., Warren, O., recently shipped a large order of hoes, mattocks and picks to France. The company is enjoying considerable demand for foreign shipment.

Business News from the Capital

Country to be Spared Extra Session of Congress—Ship Purchase Bill is Killed—Congress is Busy

Washington, Feb. 23.—With the notable filibuster in the Senate against the administration ship-purchase bill ended last Thursday by having the measure sent to conference, and Democratic and Republican leaders of that body entering into an agreement to expedite the long-delayed appropriation bills, there is every reason to think that there will be no extra session of congress this year, unless one is made necessary by the international situation. It is not believed that the revenue problem will cause the President to call an extra session. It may as well be frankly stated, however, that there is apprehension in congressional circles close to the administration that the international situation is so disquieting that developments may ensue at any time which would call congress quickly to Washington, if it should first succeed in getting away on March 4. There is, of course, as might well be expected, much irresponsible talk finding vent in the strength of the delicate international situation, as well as many unfounded published reports. One especially unfortunate phase of the matter is that some of this character of material finds its source on the floors of congress. But, taken generally, the cool heads are dominating the situation, and, best of all, partisan politics, when it comes to the international problem, has been placed on display so little as to become a negligible factor.

The sending of the ship purchase bill to conference, it may be said with virtual certainty, sounded its doom. Even though it should be reported out favorably by the conference committee on Feb. 27, as may be done in accordance with the motion adopted by the Senate, its opponents could easily, of course, prevent a vote on it before March 4. It is known that President Wilson will not call an extra session on account of the ship purchase bill. Furthermore, it has been stated in authoritative sources that the senate, if necessary, will see to it that several appropriation measures are still before it on Feb. 27—next Saturday—so that, should the conference report on the ship bill be submitted on that date, its opponents could urge that it be laid aside until the supply measures are disposed of, and that, of course, would mean its death. Should administration supporters object and urge action on the conference report, the filibuster would be renewed. But every indication is that the bill will be allowed to die in conference; or, in the event it is reported out, its supporters would not urge what would be futile, action on the bill, but would give way to the supply bills.

Death of the bill—for it is acknowledged in cloakrooms by Democrats that it has been killed—marks the first legislative defeat that President Wilson has suffered since he entered the White House, and apparently it has been received by him with real chagrin, but outwardly he has accepted the situation with good grace. He feels, it is thought, that he gained a partial victory in having the measure passed by a large vote in the house, for the Weeks-Gore bill carried as an amendment, drawn up by Senator Gore, with most features identical to the ship purchase bill which met such a tremendous onslaught in the senate. The readiness with which the gag rule can be applied in the house, however, Republicans hold, made the passage of the bill in the lower body a matter of course, and does not even mark a nominal victory for the administration. In the political campaign, Democrats are expected to make the house action basis for the claim that there is a country-wide sentiment for the ship purchase bill, and that it was strangled, through the more rigid rules of the Senate, by a minority. The Republicans, on the other hand, maintain that the bill is so fraught with dangers of various kinds, among them those of international complications and socialistic legislation, that it was the duty of the minority to save the country from such a measure. Moreover, some who at first were inclined to support the measure, now contend the need for it has passed.

Would Not Violate Anti-Trust Laws

Washington, Feb. 23.—Wade H. Ellis, of this city, former assistant to the attorney general, in an interview with *The Iron Trade Review*, said he does not think the present anti-trust laws require amending to make export combinations legal. He maintained that, in general, our anti-trust laws are designed to go no further than to protect competing producers or consumers in the United States. While in the department of justice, Mr. Ellis has charge of anti-trust litigation.

"But if it were deemed desirable to put the distinction beyond the realm of a doubt," said Mr. Ellis, "a very simple amendment of the original Sherman law so as to make it conform with the provisions of the later Clayton law would answer every purpose and assure to American manufacturers and merchants the right to cooperate for their own protection in foreign trade and to meet upon equal grounds the competition of those who are engaged in like industries in other countries."

Renewed interest in the subject of export combinations was brought about by reason of the recent convention of the Chamber of Commerce of the United States adopting a resolution favoring such combinations and because of the remarks made on the subject to the Chamber by President Wilson.

The President suggested the necessity of devising some plan by which American manufacturers and jobbers may lawfully combine their interests in foreign trade, so that in export trade, business interests in the United States may no longer be at the disadvantage which now obtains through encouragement given to their manufacturers by foreign governments in seeking foreign trade. It was stated by the President that our anti-trust laws "apparently make it illegal for merchants in the United States to form combinations for the purpose of strengthening themselves in taking advantage of the opportunities of foreign competition." He inquired whether our federal statutes, if they do make such combinations unlawful could be so amended as to permit a freer cooperation for their mutual benefit and protection among business men in this country who are engaged in export trade, without producing evils which are supposed to result from domestic combinations, and without affording the means of securing a monopoly in America's share of such foreign trade, to the injury of competitors for that trade in this country, who are not parties to the combination.

"Those who are familiar with the practice in certain foreign countries,"

Business News from the Capital

Manufacturers Have Right to Combine to Engage in Export Trade, Says Wade H. Ellis, Former Assistant to Attorney General

said Mr. Ellis, "and in one nation particularly, will recognize that among the advantages to be obtained by cooperation among competitors in foreign trade, are (1) common selling agencies, (2) a uniform system of credits, and (3) stability of prices. To these might well be added that of a clearing house, or joint responsibility for losses, under proper safeguards, so as to insure a minimum of risk, as well as the widest practicable participation in the business. Certainly if national banks can be required, as they now are, to answer, under certain circumstances, for the default of each other in given districts, there is no reason why business men engaged in a particular line of industry and shipping to foreign countries may not undertake voluntarily to pool their interests and insure their losses.

"It is manifest to every American manufacturer who is engaged in foreign commerce, and who is acquainted with the enormous advantages possessed by his competitors in other countries, that freedom to cooperate with his competitors in his own country in the markets of other lands, would mean a great stimulus to our foreign trade, steadier employment to American labor, and in increasing respect for the American people throughout the world.

"As to amending the present anti-trust laws in order to effect these objects, it may well be doubted if they need any amendment. While every combination or monopoly in restraint of trade, either among the several states, or with foreign nations, is expressly declared to be unlawful by the Sherman act, the remedy rests generally upon the initiative of some one who has been injured, and whose complaint may be made the basis for an action, either civil or criminal, in the American courts; and it is obvious that such complaints could hardly arise from citizens of foreign countries whose business will be affected by the purchase of American goods. Further than this, the construction put upon the Sherman law by the Supreme Court in a number of recent cases requires that the restraint of trade which is forbidden must be unreasonable, and it could scarcely be held that a combination of American merchants or dealers, whose sole object was to protect their common interests, insure collection upon their sales and maintain fair prices in foreign trade, would be either unreasonable or injurious.

"But congress itself has recently given a construction to the Sherman law which so emphasizes the public policy intended to be conserved as to make it clear that no real purpose was ever conceived to extend the protection of that statute beyond the shores of the United States. The Clayton law, while it defines commerce as trade among the several states and with foreign nations, very carefully excludes from its operation any effect produced in countries outside the jurisdiction of the United States. For example, the Clayton law forbids any person engaged in such commerce to discriminate in price between different purchasers of commodities, but only when such commodities 'are sold for use, consumption, or resale within the United States or other place under the jurisdiction of the United States.' And, again, this act makes it unlawful for any person engaged in such commerce to fix a price therefor, or a rebate upon such price, on the condition that the purchaser shall not buy the goods of a competitor, but this only where the sale is made 'with the United States * * * * or other place under the jurisdiction of the United States'."

Obituaries

E. Francis Crowell, 50, treasurer and general manager of the William A. Harris Steam Engine Co., Providence, R. I., died in that city, Feb. 17.

George Alexander Lewthwaite, head of the G. A. Lewthwaite Co., manufacturers of machinery and tools, at 116 Walker street, New York City, died last week at his residence in New Rochelle. He was 38 years of age.

Zachary Taylor, head of Taylor & Co., Brooklyn, N. Y., iron founders, died on Feb. 18, at St. Augustine, Fla., where he had gone for his health. Mr. Taylor was 60 years of age.

George W. Gabriel, 59, for more than 30 years manager for George F. Blake Jr. & Co., dealers in steel and iron at Worcester, Mass., died at his home in that city, Feb. 18, after a long illness.

Geo. G. Barrett, who had been general manager of the Cleveland Drop Forge Co. and for many years was connected with the American Locomotive Works and the American Car Co., died at his home in Cammack, L. I., Feb. 19. He was 67 years of age.

Adam W. Bair, aged 69, for 35 years superintendent of the foundry at the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad Co., died recently at his home in Wauwatosa, Wis. He had been suffering from stomach trouble for eight months and lately had returned from California where he had gone in hope of regaining his health.

Jed O. Gould, general superintendent and works manager of the Gould Coupler Works, Depew, N. Y., widely known in the railway supply division of the steel and iron industry, and a resident of Buffalo for many years, died Friday evening, Feb. 19, after an illness of two weeks. Mr. Gould, who was a brother of Commodore Charles A. Gould, president of the Gould Coupler Co., was born in Batavia, N. Y., Aug. 13, 1857. He went to Buffalo when a young man and entered the postal service. Thirty years ago, when the Gould forge was established at Black Rock, Buffalo, he left the postal service and entered the forge business with his brother, Chas. A. Gould. When the forge business was moved to Depew, N. Y., and the great Gould works erected there, he became general superintendent and works manager, holding the position to the time of his death.

H. Ward Leonard, a prominent electrical engineer and inventor of electrical equipment, died suddenly at the Hotel Astor, New York City, Thursday evening, Feb. 18, where he had gone to attend a banquet of the American Institute of Electrical Engineers. Mr. Leonard was the founder of the H. Ward Leonard Mfg. Co., of Bronxville, N. Y., and had patented more than 100 inventions of importance in commercial pursuits, including those relating to electrically driven reversible rolling mills, electric mine hoists, locomotives, elevators, gasoline electric trucks, transmission gearing for motor cars, rheostats, automatic switches, electric heaters and other electric apparatus. Mr. Leonard became associated with Thomas A. Edison when he was only 23 years of age and he achieved success as an electrical engineer shortly thereafter. In 1891 he completed his inventions of the Ward Leonard system of motor control and in 1892 his multiple voltage system designed for operating motors and electric lights in factories. Mr. Leonard was a native of Cincinnati and was born there in 1861. He had been vice president and also manager of the American Institute of Electrical Engineers.

Problems of Capital and Labor

Anti-Efficiency Amendment Knocked Out By Senate Committee—
Pleas for a Preposterous Proposition

Washington, Feb. 23.—Although labor unions are indignant at the action of the senate committee on military affairs in striking from the army appropriation bill the Dietrick house rider abolishing efficiency systems in government navy yards and arsenals, it is not believed they will be successful in having the amendment restored. The senate is expediting the supply measure in order to avert an extra session, and unless some member or members of the upper house dissent from the agreement entered into between Democratic and Republican leaders not unduly to delay discussion, the military bill is expected to be passed by the senate before the latter part of the present week. The house adopted the rider without any discussion against it, but the rules in that body perhaps would have made such discussion useless anyhow.

The Chamber of Commerce of the United States, at its recent convention in this city, adopted a resolution urging that the Dietrick rider be stricken from the army bill. The question might prompt some heated discussion in conference, but in the end it is believed the action of the senate military affairs committee will be sustained. However, efforts to abolish the efficiency system have been and are being made through separate bills introduced by various members, among them Senator Borah.

Pleas Unavailing

Washington, Feb. 23.—Pleas made before the house committee on appropriations last Saturday at an executive session by President Samuel Gompers and Secretary Frank Morrison of the American Federation of Labor, with Judge Alton B. Parker, that the government pay the fines and interest assessed against the defendants in the Danbury hatters' case will be denied, according to the belief here. Chairman Fitzgerald of the committee said it had not been determined whether action of any kind, either favorable or unfavorable, will be taken at this session.

Those urging that the government pay the fines and interests renewed the old contention that the Sherman anti-trust law, under which the members of the hatters' union were prosecuted, was never meant to apply to labor organization. They also maintained that if the defendants were compelled to pay the damages, they would be ruined. The amount totaled $290,000.

Since the clerk of the house refused to accept the bill drawn up jointly by members of the house delegation from Connecticut providing that the government pay the fines and costs, saying the bill would have to be introduced separately, no action has been taken by the representatives.

House leaders are expected to strongly oppose any attempt made on the floor to have the government make good the fines and costs. It is claimed that Representative Buchanan, of Chicago, a labor union man, or Representative Maher, of Brooklyn, a member of the hatters' union, may offer an amendment to the general deficiency supply bill on behalf of the union defendants. There is no doubt that such an amendment would receive a big vote.

A member of the house appropriations committee asked Mr. Gompers why the American Federation of Labor did not pay the fines and costs by raising a subscription. Mr. Gompers replied that the federation has no power to ask for such a subscription and that even if it had, he would oppose the use of such a power.

Asked why he would take that attitude, Mr. Gompers said, "it would establish a dangerous precedent and lead to other litigation and suits if it were supposed the American Federation of Labor would pay all fines."

The committee member asked Mr. Gompers if it would not have the same effect if there were reason to think the government would pay all the fines. Mr. Gompers was silent on that point.

Northwest Legislation

While a number of questions relating to labor are being considered by northwest legislatures, they have to do largely with amendments to existing laws and no very radical innovations are anticipated.

The Washington state federation of labor, at its annual convention held in Olympia recently, went on record favoring a universal eight-hour law, undismayed by the emphatic defeat of the measure in all the Pacific coast states in 1914.

The Oregon state federation of labor met in Salem recently and announced three main objects to be handled by the delegates, all of which bear upon legislative action. On the question of correcting the employers' liability law, it was desired to bring the liability upon the owner, employer, original contractor and subcontractor, making them all equally responsible and capable of being sued either jointly or collectively. This is being handled by the legislative committee of the federation.

Governor Withycombe, in his first message to the legislature, recommended the establishment of a waiting period for investigation before payment of claims and a broader classification. He recommended, in connection with needed changes, careful consideration of the Michigan law. The federation in its consideration of the Michigan law went on record as opposing it as an amendment to the compensation act, contending that it kills the state insurance feature and turns it over to private insurance companies.

Eye Accidents

In a recent report of the industrial commission of Wisconsin, they show that over 70 per cent of all the injuries to workmen caused by chips, nails and other small objects affect the eyes. Out of a total of 346 cases reported, 32 men lost the sight of one of their eyes entirely, 217 had eyes injured, and 75 suffered from lacerations, seven from impaired sight and 15 from bruises. The causes of the above injuries were as follows: 283 were hit by chips, 14 by nails, four by stone from blasts, three by bursting water glasses and 42 by other small objects.

The commission further states that of the 70 per cent it is safe to say that fully three-fourths of these eye injuries could be avoided by the wearing of goggles, and in fact, within the past year many Wisconsin plants have adopted the use of goggles and as a result eye injuries have been almost entirely eliminated.

This is one of several items recently called to our attention by T. A. Willson & Co., Inc., Reading, Pa., who specialize in the manufacture of industrial protection glasses for workmen.

The 4-story building occupied by the Van Bibber Roller Co. on Elm street, Cincinnati, was badly damaged by fire recently causing a loss of $25,000 to machinery and manufactured stock and about $50,000 loss on the building. The company manufactures printers' rollers.

Value of Slag

Amounts to Millions of Dollars According to Testimony

George T. Bell, examiner for the interstate commerce commission, last week heard testimony at Pittsburgh to determine whether railroads should charge for hauling away furnace slag. Carriers some time ago filed tariffs naming a charge of 20 cents a ton for "wasting" slag and increasing the charge for hauling brickbats, etc., from 25 cents to 35 cents a ton. Slag has been hauled gratis in the past. Richard Jones Jr., counsel for independent steel and iron manufacturers in the Mahoning and Shenango valleys, endeavored to show that furnace slag is of actual value to the railroads.

By questioning several witnesses, he developed the fact that 312,746 tons of slag have been dumped along the lake front in Cleveland by the New York Central Lines; the value of the lake fill easily is worth $40,000,000, one witness said. It also developed that the railroads are using slag almost exclusively around lake docks and piers. For many years, slag has been used for road beds, sidings, yards, etc., by railroads operating near steel centers. It costs railroads from about 40 to 63 cents a ton to haul away furnace slag, according to testimony offered at the Pittsburgh hearings. The hearings will resume March 22 at Washington.

Valuable Book on Commerce

In these days when intense interest is centered in matters relating to foreign commerce, the volume which has been issued by La Salle Extension University, Chicago, on Ocean Traffic and Trade, is timely and valuable. The author is B. Olney Hough, editor of the *American Exporter*, who is thoroughly qualified to discuss all phases of shipping problems. "Wise planning and cool, far-sighted strategy are called for in meeting the greatest emergency in history, commercial no less than political," says Mr. Hough. The truth of these words is being demonstrated every day. While Mr. Hough discusses our maritime policy and other matters of national policy concerning which there may be differences of opinion, the book is devoted largely to giving facts as to methods of carrying on business with foreign countries. For example, in discussing ocean carriers, he makes a comparison of services, describes kinds of steamships and steamship lines and tramps. A chapter is devoted to seaports and terminal facilities, and other chapters are on ocean shipping roads and services, charters and ocean freight rates, shipping agreements, handling export and import shipments, marine insurance, finances of shipping companies, ways of obtaining export orders and the very important subject of foreign credits and collections.

Chattanooga's New Industry

Formal organization of the Chattanooga Stamping & Enameling Co., which is building a plant at Chattanooga, has been perfected. William, Charles and Louis Lipphardt, Francis Martin and C. H. Huston constitute the board of directors. William Lipphardt was elected president, Mr. Huston, vice president; Charles Lipphardt, general manager, and Louis Lipphardt, secretary-treasurer. Charles and Louis Lipphardt are sons of William Lipphardt, the founder, formerly of Wheeling, W. Va. The Lipphardt business is one of several attracted to Chattanooga by presentation, through the Chattanooga Industrial Board, of the city's advantages for new industries. The Stamping & Enameling company has a capital of $200,000. Temporary offices, pending completion of building at the factory site, have been established in the mercantile district of the city proper, the plant being across the Tennessee river from the city. Present building operations have been extended to include an office structure separate from the main building.

The Edward Maher's Sons, Newark, N. J., are contemplating the installing of a modern machine shop in addition to their gray iron foundry, in order to handle certain large machinery contracts of firms in the metropolitan district. John D. Miller has been made general manager and will take charge immediately. Mr. Miller was formerly with the Wheeling Mold & Foundry Co., Wheeling, W. Va., and is well known in foundry and machine circles in that section.

Crocker Bros., 30 East Forty-second street, New York City, have made arrangements with the firm of Woods, Huddart & Gunn, 444 Market street, San Francisco, to handle and distribute their pig irons, ferro-alloys and coke on the Pacific coast. Charles M. Gunn will have personal charge of the new department.

The William Tod Co., Youngstown, has received an order for several large machines from the Fulton Iron Co., St. Louis, manufacturer of sugar grinding machinery.

New Tariff

In Canada Discussed by a Leading Manufacturer

Toronto, Feb. 23.—Frederic Nicholls, vice president of the Dominion Steel Corporation, and president of the Canadian General Electric and Canadian Allis-Chalmers companies, in an interview with your correspondent regarding the new tariff said: "I do not look upon the recent tariff as designed as a protective measure, but consider it solely as imposing increased taxation to augment the revenue. If particular industries had been granted increased duties of 7½ per cent, without corresponding advances upon their raw materials and machinery, the manufacturers would have received the whole benefit, but inasmuch as a horizontal increase covers all commodities, the actual increase of protection relatively is very small. The increase will no doubt have one good effect—the employment of more labor, as under the old tariff manufacturers could not in many cases compete with importations, whereas the present increase will enable such articles to be manufactured in Canada, though, on account of the horizontal increase no greater profits can be looked for in the case of already existing industries."

The automobile industry has already commenced to benefit by the increase in the tariff on imported cars. It has increased the price of the more expensive American cars by about $250, and that of the cheaper vehicles in proportion, the raise being just sufficient to allow the Canadian manufacturer to compete successfully. The industry, instead of suffering by the war, is benefited by it, as the demand for automobiles is greater than ever. Many who would otherwise have gone abroad for the summer will remain at home and take automobile tours instead.

The Canadian Freight Association, acting on behalf of all the railway companies has applied to the Canadian Board of Railway Commissioners for permission to make a general advance in freight rates. The increases in rates on pig iron, billets, wire rods, rails, iron ore, concentrates, etc., range from 5 to 30 cents per ton on a sliding scale based on present rates. The proposed advance on coal and coke is 10 cents per ton.

At a special meeting of the bondholders of the Canada Machinery Corporation, Ltd., at Galt, on Feb. 18, the sale of the company's property at Hamilton was authorized. This action means the concentration of the company's business at Galt and extensions to the plant there.

'Busy' Portrays Machine Market

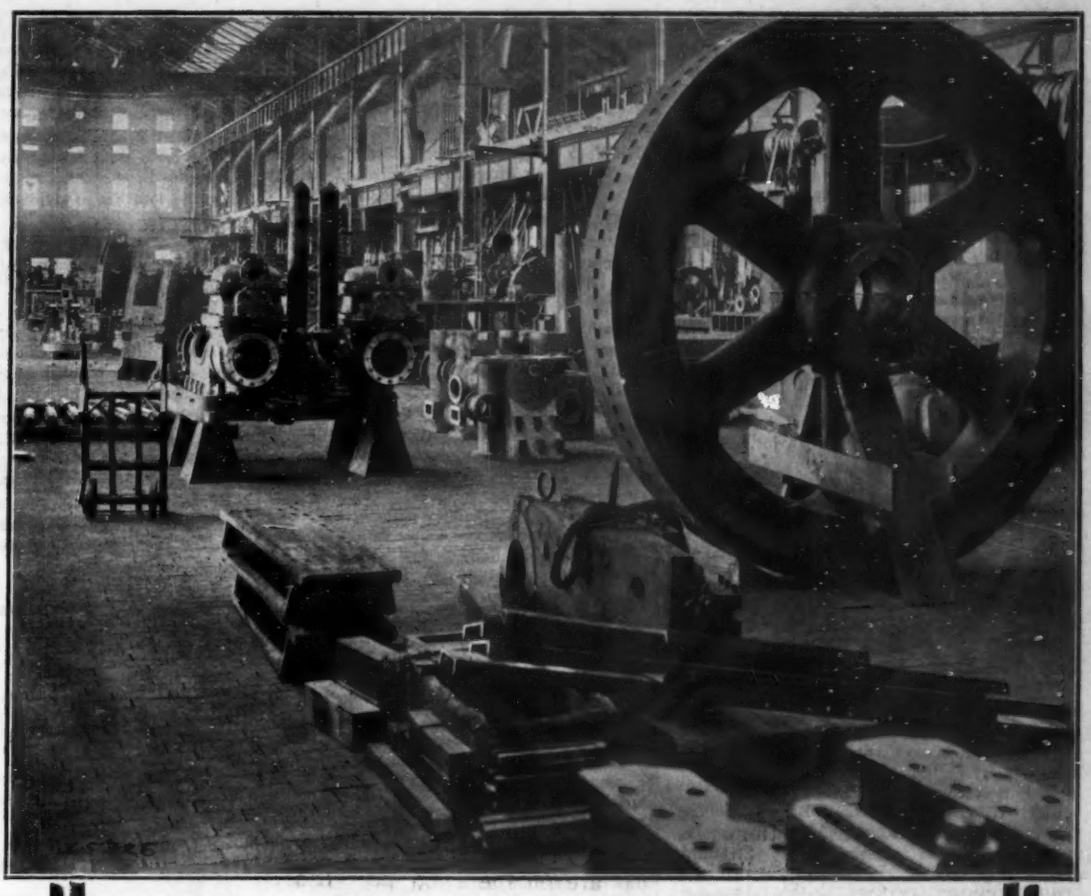
Indications in East Point to February as Best Month Since Outbreak of War—Pittsburgh District is Awakened at Last—Demand in West is Spotted and Uneven

EASTERN machinery sellers again report the transaction of a large amount of business, and it now seems certain that February, from the point of view of business booked, will prove the most satisfactory month since the outbreak of the war. The recent heavy buying is reflected in reports from a great many machine tool plants where working schedules have been increased still further. A great many plants which only recently were operating normally now are working late evenings and many are putting on night shifts. Some builders of lathes say they have enough work to keep them busy until September, and makers of other kinds of machine tools are nearly as crowded. The past week closed with a large amount of business pending, among which are included the following inquiries: Seventy-five turret lathes for the Safety Car Heating & Lighting Co., 2 Rector street, New York; some 15 machine tools for a vocational school at Franklin, N. J.; 75 turret lathes and a number of screw-cutting machines for the Groton Bridge Co., Groton, N. Y.; several projectile presses for the E. W. Bliss Co., Brooklyn, N. Y.; equipment for the Imperial Steel & Wire Co., Collingwood, Ont., for making 25,000 18-pound shells, and equipment for the Westinghouse Electric & Mfg. Co., Pittsburgh, for making war material. In addition there are several other concerns that are on the point of closing for considerable quantities of equipment for making war material. The Bethlehem Steel Co. has bought a number of additional lathes and is in the market for more lathes as well as some other machinery. Among concerns which are expected to be in the market for equipment shortly are the Wemlinger Steel Piling Co., 11 Broadway, which will build a new plant at Kingston, N. Y.; the Oswego Machine Co., Oswego, N. Y., which will build a large machine shop addition immediately; the Automobile Supply Co., Brooklyn, N. Y., which has under contemplation the removal of its plant to New Jersey, and the Middletown Car Co., Middletown, Pa., which will build large additions. The Winchester Repeating Arms Co., Bridgeport, Conn., continues to be a buyer of miscellaneous equipment. It now is expected that Mr. Woo, general superintendent of the Hangyeh Ping Iron & Steel Co., China, and his associates, who have been in London for several weeks, will return to this country the latter part of February or early part of March in order to issue formal inquiries and possibly close for a considerable quantity of rolling mill, steel plant and blast furnace equipment. The buyer of the 100 turret lathes, mentioned in THE IRON TRADE REVIEW of Feb. 4, was the Traylor Engineering & Mfg. Co., Allentown, Pa., which booked a war contract. This company has bought considerable other equipment and still is in the market.

Machine tool builders at Pittsburgh are unusually busy and several of them have obtained attractive orders for turret lathes, grinding and milling machines. As the names imply, the machines will be used for the manufacture of shells for belligerent nations whose representatives are actively figuring in this district for the first time since the outbreak of the war. Although no official information has been given out, it generally is understood the Westinghouse interests, including the Westinghouse Electric & Mfg. Co., the Westinghouse Machine Co. and the Westinghouse Air Brake Co. are busily engaged making shrapnel, from 3 to 6 inches in diameter. One of the companies has bought 10 automatic turret lathes, another has purchased a dozen lathes of similar type, and the third concern has practically concluded negotiations for 100 turret lathes; a number of grinders and milling machines also have been purchased. Orders, it unofficially is reported, were distributed among the following: The Gisholt Machine Co., Madison, Wis.; the National Acme Mfg. Co., and the Warner & Swasey Co., both of Cleveland; the New Britain Machine Co., New Britain, Conn., and the Reed-Prentice Co., Worcester, Mass. An inquiry for 1,000,000 shrapnel shells still is pending in this district. The McKeesport Tin Plate Co. will add 20 tin plate mills to its plant at McKeesport. The Alloy Steel Forging Co., building a new plant at Carnegie, Pa., has bought a 20-ton Pawling & Harnishfeger Co. crane, and will buy some shop equipment at an early date. Generally speaking, there is no change in the domestic inquiry for machine tools or rolling mill equipment.

Were it not for the business which comes to machine tool manufacturers directly from the European war situation and other demands met by dealers as an indirect result of the war, the machine tool business in Chicago would be exceedingly flat. As it is, the demand is spotted and uneven. Some dealers find a demand for general shop equipment on the part of manufacturers of implements and motor trucks, while others are unable to scare up a prospect and to them the outlook continues bleak. Although nearly two months have passed since railroads received permission to advance their freight rates and thus increase their income, not a single railroad machine tool list has been issued and makers and dealers are utterly unable to interest purchasing agents. There is constant promise that a little later large purchases will be made, but in the meantime nothing is offered.

In Cincinnati, the machinery market continues on the upgrade, especially that for machine tools. An encouraging feature is that domestic business has begun to come in, in addition to numerous demands from European nations engaged in the war. The Modern Machine Tool Co. is working overtime on domestic orders that are coming from all parts of the country and the American Tool Works Co. has also received several good orders from this country. The Cincinnati Iron & Steel Co. also reports a much improved domestic business, as well as good sales to European countries. The demand for lathes is still in the lead, with that for metal boring machinery, such as radial drills, a close second. Several makers of planers have temporarily abandoned the manufacture of their product and are making different parts for lathes. Orders for woodworking machinery have improved over those of last month. The machine tool industry in this city is experiencing one of the best months in its history. Demand for shapers still continues slow.



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WOOD BLOCKS

Making good where others fail—

The above illustration shows an installation of **Ayer & Lord Interior Wood Blocks** in the plant of the **National Transit Co.** This company is a large manufacturer of **pumps, engines, oil well supplies,** etc.

Other floorings that were used here were completely worn out under the severe service, but Ayer & Lord Interior Wood Blocks are making good in every respect.

There is considerable trucking in this room, and the flooring has to undergo many other severe treatments.

Note the heavy loads set on pedestals—yet the level of the floor is not affected.

A favorable word from a user:

"A year ago we floored one end of our mill with Ayer & Lord Tie Company's blocks with results that are entirely satisfactory. During the month of November we put down another section of the same material which is the best evidence that we are pleased with the blocks and the completed floor.

"We highly recommend it for rolling mills or other factories where heavy weights are moved by trucks."

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KANSAS CITY, MO.—1117 Rialto Building
MEMPHIS, TENN.—1402 Exchange Building
PHILADELPHIA, PA.—319 Perry Building

EASTERN STATES

AUGUSTA, ME.—Municipal electric light plant is proposed for Waterville in a legislative bill introduced by Gideon Picher, of that city.

BOSTON.—United States Radiator Co. has been granted a permit to erect two brick storehouses in South Boston.

BOSTON.—Haven & Crosby, architects, 40 Central street, are preparing plans for 1-story and basement, 45 x 60-foot power plant, for Andrew Kerr Co.

BOSTON.—Federal Mfg. Co. has been incorporated to manufacture tools and machinery; $10,000 capital stock; by F. M. Phelan, Frederick McGrath, J. A. Conway.

BOSTON.—Merrill Process Co. has been incorporated for the manufacture of heating appliances; $75,000 capital stock; by John C. Heyer, Parker G. Stevens, Arthur N. Rice.

ORANGE, MASS.—L. B. Taylor, Athol, Mass., contractor, will begin work shortly on the Red Arrow Automobile Co.'s 40 x 66-foot, cement factory on East River street.

SALEM, MASS.—Salem and Beverly water supply board will receive bids at the city hall until 10 a. m., March 10, for the construction of additional works for water supply from the Ipswich river; work will be divided into two parts: First contract including the construction of a dredge, 120,000 cubic yards of excavation, 2,870 feet of conduit and accessories; second contract covers an electric motor-driven centrifugal pump, steam turbine driven generator, transmission line, transformers, switchboard and wiring; Hazen, Whipple & Fuller, consulting engineers, 30 East Forty-second street, New York City.

BRIDGEPORT, CONN. — Baird Machine Co. will build a $10,000, 40 x 140-foot, 1-story steel frame storehouse on Stratford avenue.

BRIDGEPORT, CONN.—Architects Kendall & Taylor, Boston, have let general contracts to Schwartz Bros., Boston, for construction of 3-story and basement, 80 x 120-foot addition to plant of Royal Equipment Co., Bridgeport.

BRISTOL, CONN. — Wallace Barnes Co., manufacturer of steel clock springs, etc., has awarded contract to Torrington Building Co., of Torrington, Conn., for erection of a new rolling mill, 80 x 100 feet, for boiler house, 30 x 30 feet, and for frame pickle house, 30 x 30 feet.

HARTFORD, CONN. — Riverside Iron Works Co. has been incorporated; $25,000 capital stock; by Abraham Azea, Harry Segil, Samuel Dorfman, Morris Dworski.

HARTFORD, CONN.—International Horseshoe Co. has been incorporated; $50,000 capital stock; by James Pullar, Edward J. Manning, Otto Kaufman, Clarence E. Whitney, F. Irwin Davis.

BINGHAMTON, N. Y. — Local plant of American Fork & Hoe Co., Cleveland, badly damaged by fire, Feb. 18; loss estimated at $50,000 to $75,000.

BROOKLYN.—E. W. Bliss Co. is expected to be in the market shortly for some additional projectile presses.

BROOKLYN. — Moyer & Fairbault, engineers, have been incorporated; $15,000 capital stock; by H. E. Mohr, T. W. and S. E. Maires, 672 Ocean avenue.

BROOKLYN. — Automobile Supply Mfg. Co., one of the largest makers of automobile horns and accessories in this country, occupying the 5-story building at 220-224 Taaffe place, and several lofts in adjoining buildings, has announced its intention to move its entire business to New Jersey, as soon as a suitable site can be procured.

CUBA, N. Y.—Cuba Knife Co., cutlery, has been incorporated; $25,000 capital stock; by H. P. Morgan, C. A. Wheeler, G. L. Robinson.

MILLBROOK, N. Y.—Aetna Dynamite Co., powder, explosives, munitions, has been incorporated; $100,000 capital stock; by C. A. and F. L. Belin, A. J. Moxham, 2 Rector street.

NEW YORK.—Safety Car Heating & Lighting Co., 2 Rector street, is inquiring for prices on 75 turret lathes.

NEW YORK.—Empire Railway Appliance Co., 30 Church street, has increased its capital stock from $500,000 to $600,000.

NEW YORK.—Wemlinger Steel Piling Co., 11 Broadway, has completed plans and will commence construction in spring, of a 1-story, 50 x 120-foot plant at Kingston, N. Y.

NEW YORK.—New York Mills Corporation, mills, cotton, yarns, etc., has received its charter; $1,000,000 capital stock; P. M. Smith, C. A. Braman, F. A. Julliard, 70 Worth street, incorporators.

NEW YORK.—Tropenas Converter Co., 50 Church street, has put out the following list of machine tools for prompt delivery for export to France: Two plain lathes having approximately the following characteristics; swing from 240 to 500 millimeters, length between centers from 1,000 to 2,500 millimeters; six gap lathes, to have beds from 1,200 to 1,500 millimeters long, swing from 300 to 360 millimeters, quick change gear on lead screw and feed shaft, 3-step cone with back gearing, hollow spindle fitted with conical brass bushings and thrust ball bearing, carriage with automatic longitudinal and cross feed, set-over tail stock, countershaft to be supplied complete with hangers, bearings, shift lever and necessary accessories for forward and reverse motion; each lathe should be supplied with the following: One chuck about 120 millimeters in diameter, one chuck about 200 millimeters in diameter with independent regulation of jaws, one small face plate for dog attachment, one face plate as large as possible with four jaws, one steady rest, one follow rest, one set of wrenches, one drill chuck for tail stock. One turret lathe, as per following specifications also is required: Bed about 1,500 millimeters long, swing about 324 millimeters, hollow spindle for 30-millimeter bar stock, turret with six holes, one threading attachment with set of lead or mother screws, pump, tank and piping, countershaft for forward and reverse motion complete with hangers, bearings, shaft lever and all accessories including one set of wrenches, two quick acting milling machines for brass and composition, head to be movable so as to allow work horizontally, vertically and under all angles, 3-step cone and back gearing, table about 500 x 800 millimeters, vertical displacement about 350 millimeters, horizontal displacement about 300 millimeters, one set of wrenches, complete countershaft with hangers, bearings, shift lever and accessories. Second hand machines will be considered if good.

NIAGARA FALLS, N. Y.—Electric Furnace Products Co., Ltd., a subsidiary of the Union Carbide Co., will establish a large plant at Saude, Norway.

OSSINING, N. Y.—J. P. Powers Mfg. Co., metals, has been incorporated; $5,000 capital stock; by H. M. Carpenter, J. Royle, J. P. Powers.

OSWEGO, N. Y.—Oswego Machine Co., which last year contemplated the erection of a large machine shop addition, and which later dropped the project, has decided to go ahead at once with this work.

ROME, N. Y.—Rome Wire Works has let contract for erection of addition to cost $3,000.

UTICA, N. Y.—Utica Gas & Electric Co. has increased its capital stock from $2,000,000 to $4,500,000.

ALLENTOWN, PA.—Kaltenbach & Stephens, Lodi, N. J., have let contracts, for 1-story, 95 x 356-foot silk mill, to be erected at Allentown, to F. L. Dillon, general contractor, Lodi.

CENTRAL STATES

AKRON, O.—Burger Iron Co. has increased its capital stock from $125,000 to $375,000 to provide for large additions to the plant; J. A. Burger, secretary-treasurer.

BARBERTON, O.—Inland Petroleum Co., Chicago, is negotiating with R. H. Hawkins, secretary of the chamber of commerce, regarding the location of a plant in Barberton.

CINCINNATI.—Anders Shale Brick Co. has been incorporated; $40,000 capital stock; by Adam C., Anna D., Edith, John, Theodore and Anna M. Anders.

CINCINNATI.—Garber & Woodward, architects, will prepare plans at once for a $700,000 high school building to be built in the eastern part of the city; the amount of steel to be used has not been determined.

CINCINNATI. — Electric Horsepower Co. has been incorporated; $50,000 capital stock; by Robert D. McCreery, David L. Taylor, Joseph L. Schneider, Lawrence Pape, Charles Appel.

CINCINNATI.—Christian Moerlein Brewing Co. is considering the advisability of doing away with the present method of raising steam and installing one or more engines of the turbine type; the change would cost $100,000.

CINCINNATI.—Charles McCall Co., Philadelphia, was low bidder for the $2,500,000 Hamilton County court house to be built in Cincinnati; the contract will not be let for several weeks until all of the bids have been considered. The building will be of granite and marble and will be re-inforced with steel throughout, the total tonnage of which has not been determined.

CLEVELAND. — Lake Shore Electric Co. has increased its capital stock from $7,500,000 to $8,000,000.

CLEVELAND.—Berry Bros. Co., contracting, has been incorporated; $25,000 capital stock; by Thomas and Hugh Berry, John T. Feighan, R. C. Heil, William F. Creadon.

CLEVELAND.—County commissioners will receive bids until 10 a. m. (central standard time) March 13 for construction of bridge work, (3-hinge arch) per report No. 3,480.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, March 9, for a 3-ton motor truck for the bridge department.

CLEVELAND.—S. Austin Co., contractor, will start work at once on a $17,500, 2-story, brick factory building for the Henly Investment Co.

CLEVELAND.—Nickel Plate Elevator Co., grain products, has been incorporated; $50,000 capital stock; by L. D. Greenfield, J. Freund, Charles Kovanda, E. J. Albl and E. J. Kovanda.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, March 5 for seamless steel tubing for the department of public utilities, water division; also on that date for nine motorcycles for the department of police.

CLEVELAND.—J. S. Kohn, attorney who heads a company for the promotion of a $1,000,000, 7-story, brick, concrete and terra cotta family hotel on University circle, says plans have been completed to proceed with the construction of proposed hotel during the summer; S. H. Weis, architect.

CLEVELAND. — Osborn Engineering Co. will prepare plant for the Cleveland, Akron & Canton Terminal Railroad Co.'s $10,000,000 Cleveland terminal, including a subway under the eastern part of the city and a 10-story terminal warehouse; E. F. Hutches, secretary, 915 Rockefeller building.

CLEVELAND.—Elyria Iron & Steel Co., Elyria, O., has negotiations about completed

for a 10-acre site at East 131st street and St. Clair avenue, on which a $75,000 steel plant will be erected for the manufacture of tubing for automobiles, bicycles, etc.; Earnest McGeorge, Cleveland, architect, is drawing preliminary plans, which call for a brick structure to have between 40,000 and 45,000 square feet of floor space. It is stated the proposed Cleveland plant will be run independent of the Elyria plant, but under the same management; Henry Wick, Elyria, president; Myron A. Wick, Cleveland, treasurer.

COLUMBUS, O. — Martin Krumm Co., structural works, has been incorporated; $15,000 capital stock; by Martin, Howard L., Mary E., Ruby and Helen Krumm.

COSHOCTON, O.—Chester & Fleming, engineers, Pittsburgh, have prepared plans for a 3,000,000-gallon reinforced concrete covered reservoir for this city.

DAYTON, O.—Universal Electrical Equipment Co. has been incorporated; $50,000 capital stock; by R. Harry Croninger, Carl F. Brockway, S. Russell Prugh, Louis B. Williams, Edward E. Burkhart.

FINDLAY, O.—Adams Brothers Co. has changed its name to the Adams Truck Foundry & Machine Co.

FOSTORIA, O.—Fautless Anchor Co. plans to enlarge its factory on McDougal street.

FOSTORIA, O. — Storm Buggy Co. has been reorganized with a capital of $25,000 and will erect a factory building at once; P. J. Blaser, general manager.

FT. LORAINE, O.—Ft. Loraine Light & Power Co. has been incorporated; $10,000 capital stock; by J. W. and Frances M. Sherman, B. T. Bull, H. E. Bennett, John Oldham.

HAMILTON, O.—Bids will be opened within 30 days by the commissioners for $2,500 bridge at Middletown.

HAMILTON, O. — County commissioners will advertise for bids shortly for rebuilding the Columbia bridge at a cost of $60,000 to $80,000.

LANCASTER, O. — George J. Gearhart, county auditor, will open bids March 4 for the superstructure for the Bought bridge over Hocking river in Greenfield township, 56-foot clear span, 16-foot roadway, with creosoted wood block floor; also superstructure for Spangler bridge, over Hocking river, 50-foot clear span, 13-foot roadway, creosoted wood block floor; certified check 10 per cent required.

LEAVITTSBURG, O. — Trumbull Clay Products Co. has been incorporated; $20,000 capital stock; by E. C., J. W. and L. C. Wolcott, F. F. Rowland, C. M. Bixler.

LEBANON, O.—Chestatee Dredging Co. has been incorporated; $25,000 capital stock; by Albert French, E. W. Spreng, Joseph L. Roberts, S. J. Aungst, George A. Meloy, Stanley M. Seller and Ray L. Herrick.

LORAIN, O.—Brunk Forge & Machine Co., Phillip Brunk, president, has purchased a site on Broadway, and will erect an addition to its plant to cost, including equipment, about $10,000.

NEWARK, O.—Blair Motor Truck Co. has increased its capital stock from $100,000 to $225,000.

NORWALK, O.—A $100,000 bond issue for the erection of a municipal lighting plant has been sold; preliminary plans will be taken up by the council.

SPRINGFIELD, O. — Widam Mfg. Co., New York, automobile supplies, is seeking a location in Springfield.

TOLEDO, O.—Service Director Boardman has plans for about $50,000 worth of improvements for the filtration plant; a change from gas to electric power is being considered.

WARREN, O.—City Engineer Hempel will prepare specifications for a $34,000 bridge, 325 feet long and 34 feet wide.

YOUNGSTOWN, O.—Northwest Side Improvement association has recommended the construction of a viaduct at the foot of Belmont avenue.

YOUNGSTOWN, O.—Chester & Fleming, engineers, Pittsburgh, have completed plans for a water works system and filtration plant for this city.

ZANESVILLE, O.—The board of public service contemplates building a $400,000 filtration plant, to include filter system, cast iron piping, two pumping stations, reservoir, etc.; the reservoir will be of concrete construction, with a capacity of 1,000,000 gallons; W. J. Sherman Co., Nasby building, Toledo, is preparing plans.

The Shipping Bill

You noted, of course, that they were chanting a dirge at Washington over the shipping bill.

But—

Constant Reader—

Have a Heart.

We refuse to truckle to capitolistic whims, and

Are still on the job.

The shipping bill you are most interested in is a

Bill of Lading

And

Here are the TIPS

For you to convert

Into ORDERS.

Each week they are better, so

WATCH THIS SPACE

NEXT THURSDAY.

Safety Car Heating & Lighting Co., 2 Rector street, New York City, is inquiring for prices on 75 turret lathes.

Tropenas Converter Co., 50 Church street, New York City, has put out the following list of machine tools for prompt delivery for export to France: Two plain lathes, 6 gap lathes and one turret lathe. Second hand machines will be considered if good.

Franklin Public School, Franklin, N. J., is taking bids on 15 machine tools.

Westinghouse Electric & Mfg. Co., Pittsburgh, is expected to be in the market shortly for additional machinery to turn out war orders which it has booked.

Imperial Steel & Wire Co., Collingwood, Ont., is taking bids on equipment to make 25,000 18-pound shells.

E. W. Bliss, Brooklyn, is expected to be in the market shortly for some additional projectile presses.

E. R. Crawford, president of the McKeesport Tin Plate Co., which operates a plant at McKeesport, Pa., says 20 tin plate mills will be added as soon as possible. Plans for a new addition are being considered, and contracts for equipment will be let shortly.

Parkersburg, Marietta & Interurban Railway Co. will begin the erection of a $500,000 generating station in the spring to take place of the present power house. Sanderson & Porter, 52 William street, New York City, electrical engineers, are expected to have preliminary details ready within 60 days.

Oswego Machine Co., Oswego, N. Y., will start the erection of a large machine shop addition immediately and, it is expected, will be in the market for equipment shortly.

Bethlehem Steel Co., Bethlehem, Pa., has bought a number of lathes and is in the market for more lathes as well as some other machinery.

Alloy Steel Forging Co., which is building a plant at Carnegie, Pa., will buy some shop equipment at an early date.

SOUTHERN STATES

RICHLAND, GA.—City will vote March 24 on $20,000 bonds to extend light and water systems and construct sewers.

ROME, GA.—W. M. McCormick and M. C. Broach have organized a company with a capital stock of $15,000, to be known as the American Municipal Motor Co. and will erect a plant for the manufacture of motor trucks.

JACKSON, MISS.—City will vote March 13 on $160,000 bonds to construct electric light and power plant; M. L. Culley, city engineer.

DALLAS, TEX.—It is reported the Proctor-Gamble Co., Cincinnati, soap manufacturer, plans to erect a branch plant at either Dallas or Fort Worth, Tex., which will employ between 600 and 1,000 men.

MEMPHIS, TENN.—City Engineer Weatherford has prepared plans for a $100,000 viaduct over the Illinois Central railroad; bridge will be built this season.

WESTERN STATES

ANACONDA, MONT.—It is reported the McArthur, Perks Co., New York and Chicago, which was awarded a contract in July, 1914, for constructing the Boston & Montana railroad, 109 miles long from Divide through Big Hole county to Jackson, will start work at once; W. R. Allen is one of the promoters.

THOMPSON FALLS, MONT.—Thompson Falls Power Co. will start work at once on another power plant about 9 miles down the river from the plant, now nearly completed, near Blue Slide.

MULLAN, IDA.—It is reported the Interstate-Calahan Co. probably will enlarge its present concentrator about 30 per cent.

ABERDEEN, WASH.—Pacific Telephone & Telegraph Co. will spend about $10,000 for improvements in the West Aberdeen district.

ABERDEEN, WASH. — Preliminary plans have been announced by the Gas Service Co. of America, Auburn, Wash., for constructing gas plants at Montesano, Aberdeen, Elma and Hoquiam, Wash., with estimated costs of $40,000, $80,000, $40,000 and $60,000 respectively.

BELLINGHAM, WASH.—J. J. Lynch, engineer of construction for the Postal Telegraph Co., says work will begin shortly on a $90,000 line running from Seattle, by the way of Bellingham, to Sumas, Wash.

ELLENSBURG, WASH.—City is planning improvements for the municipal light plant.

SEATTLE.—Simonds Mfg. Co., 119 Jackson street, has taken control of the Washington Saw Co. and will enlarge the plant.

SEATTLE.—Clarland Iron Works has been incorporated; $10,000 capital stock; by D. C. Blissland, A. B. Clark; Skeel & Whitney, 1007 Alaska building, attorneys.

TACOMA, WASH.—Central Heating Co. will apply to the council for a franchise.

SACRAMENTO, CAL.—Two-Lock Nut Co. has been incorporated to manufacture bolts, nuts and lock nuts; $10,000 capital stock; by C. E. Weinich, E. C. Kavanaugh, F. F. Smith, John A. Crombach, J. P. Dargitz.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to April 1.)

Bessemer, valley	$13.60
Bessemer, Pittsburgh	14.55
Basic, Pittsburgh	13.45
Basic, eastern Pa.	14.00
Malleable, Pittsburgh	13.70 to 13.95
Malleable foundry, Chicago	13.00 to 13.50
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.50 to 13.00
No. 1X foundry, Philadelphia	14.50 to 14.75
No. 2 foundry, Pittsburgh	13.95
No. 2 foundry, valley	13.00 to 13.50
No. 2 foundry, Cleveland	13.50
No. 2 foundry, Ironton	12.75 to 13.00
No. 2 foundry, Chicago	13.00 to 13.50
No. 2X foundry, Philadelphia	14.25 to 14.50
No. 2X fdy., N. J. tidewater	14.25 to 14.50
No. 2X foundry, Buffalo	12.50 to 13.00
No. 2 plain, Philadelphia	14.00 to 14.25
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.25 to 12.75
No. 2 southern, Birmingham	9.50 to 10.00
No. 2 southern, Cincinnati	12.40 to 12.90
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	14.00 to 14.50
No. 2 southern, Cleveland	13.50 to 13.75
No. 2 south'n, New York, docks	13.75 to 14.00
No. 2 southern Boston, docks	13.75 to 14.25
No. 2 south'n, interior New Eng.	14.50 to 15.50
No. 2 southern, St. Louis	14.00 to 14.25
Virginia No. 2X furnace	12.50 to 12.75
Virginia 2X, Philadelphia	15.25 to 15.50
Virginia 2X, Jersey City	15.50 to 15.75
Virginia 2X, Boston points	15.75 to 16.00
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.45 to 13.70
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	15.50 to 15.75
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7c to 8c
Foreign non-Bess., 50 to 65 per cent.	7c to 8c

COKE

(At the ovens)

Connellsville furnace	$1.55 to 1.65
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy., contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-mang., Balti. (prompt)	$90.00 to 100
Ferro-manganese, Balti. (for'w).	68.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open-hearth billets, Phila.	$21.40 to 21.90
Forging billets, Phila.	24.40 to 25.40
Forging billets, Pbgh.	24.00 to 24.50

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.61
From Youngstown	.63
From Niles	.63
From Wheeling	.61
From Steubenville	.61
From Johnstown	.595
From Coatesville	.54
From Steelton	.55
From Bethlehem	.525
From Cleveland	.64
From Chicago	.75

Wire rods, Pittsburgh	$25.00
Billets, Pittsburgh	19.50 to 20.50
Billets, Youngstown	18.50 to 19.50
Sheet bars, Pittsburgh	20.00 to 21.00
Sheet bars, Youngstown	19.00 to 20.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect, Pbgh. base.	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.85
New England	2.85
Philadelphia	2.65
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.10c
Structural shapes, Chicago	1.34c
Structural shapes, Philadelphia	1.25c to 1.30c
Structural shapes, New York	1.26c to 1.31c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.34c
Tank plates, Pittsburgh	1.10c
Tank plates, Philadelphia	1.25c to 1.30c
Tank plates, New York	1.26c to 1.31c
Bars, soft steel, Pittsburgh	1.10c
Bars, soft steel, Chicago	1.34c
Bars, soft steel, Philadelphia	1.25c to 1.30c
Bars, soft steel, New York	1.26c to 1.31c
Hoops, carloads, Pittsburgh	1.25c to 1.50c
Hoops, less carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.10c
Shafting, carloads, Pbgh., disc. contract	67 to 68
Bar iron, Chicago	1.07½c to 1.10c
Bar iron, Philadelphia	1.12c to 1.22c
Bar iron, New York	1.10c to 1.15c
Bar iron, Cleveland	1.15c
Bar iron, Pittsburgh	1.10c to 1.15c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.85c
No. 28, black, Chicago	1.94c to 1.99c
No. 28, tin mill, black, Pbgh.	1.85c
No. 28, galvanized, Pbgh., nom.	3.25c to 3.40c
No. 28, galvanized, Chgo. (nom)	3.59c
No. 10, blue, annealed, Pbgh.	1.30c to 1.35c
No. 10, blue, annealed, Phila.	1.50c
Tin plate, 100 lb., coke base	$3.10 to 3.20

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll., and re-anl.	30 cents
Hot roll'd, pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller levelling	10 cents
Patent levelling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open-hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches	80	69½
Iron, ⅜ to 2½ inches	70	59
	Lap-weld.	
Steel, 2½ to 6 inches	79	68½

BOILER TUBES

Steel, 3¼ to 4½ inches	74
Iron, 3½ to 4¼ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Wire nails, retailers, Pittsburgh	1.60 to 1.65
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Plain wire retailers, Pittsburgh	1.40 to 1.45
Galvanized wire, jobbers, Pbgh.	1.75 to 1.80
Galvanized wire, retailers, Pbgh.	1.80 to 1.85
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	1.95 to 2.00
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, painted, retailers, Pbgh.	1.60 to 1.65
Barb wire, galv., retailers, Pbgh.	2.00 to 2.05
Barb wire, galv., jobbers, Pbgh.	1.95 to 2.00

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ¾ x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85 and 5.

Hot pressed square, blank or tapped nuts, $6.50 off list; hot pressed hexagon blank or tapped, $7.40 off.

Cold pressed, square, blank or tapped, $6.20 off; hexagon, blank or tapped, ⅝ inch and larger, $7.50; ½-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler irvets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon,	Base price Cut to length Hard.	Soft.
1¼ inch and wider	2.85	3.10
0.100 and thicker	2.85	3.10
0.050 to 0.099 inc.	2.95	3.20
0.035 to 0.049 inc.	3.10	3.35
0.031 to 0.034 inc.	3.35	3.75
0.025 to 0.030 inc.	3.60	4.00
0.020 to 0.024 inc.	3.80	4.20
0.017 to 0.019 inc.	4.70	5.20
0.015 and 0.016	5.10	5.60
0.013 and 0.014	5.95	6.45
0.012	6.55	7.05
0.011	6.90	7.40
0.010	7.25	7.75
	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Three to 20 in., Cleveland	$21.50
Twenty-four to 48-in., Cleveland	21.00
Four-inch, Chicago	26.00
Six to 12 inches, Chicago	24.00
Large sizes, Chicago	23.00
Six-inch, New York	20.00 to 20.50
Four-inch, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.80c
Steel bars, Philadelphia	1.65c to 1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.60c to 1.70c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.85c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.65c to 1.70c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve.	2.05c
No. 10 blue anl. sh., St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	1.95c
No. 28 black sheets, Chgo	2.55c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	3.75c
No. 28 galv. sheets, Cleveland	3.50c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.55c

Freight Rates, Coke

From Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 9.00 to 9.50
No. 1 railroad wrought, Cleve.	9.25 to 9.75
No. 1 railroad wrought, St. L.	8.00 to 8.50
No. 1 railroad wrought, Cincin.	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.50 to 9.00
No. 2 railroad wrought, St. L.	8.00 to 8.50
Arch bars and transoms, Chgo.	12.25 to 12.75
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. & spr'gs, Chgo.	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L.	8.50 to 9.25
Iron car axles	13.75 to 14.25
Shafting, Chicago	11.75 to 12.25
Shafting, St. Louis	11.00 to 11.50
Steel car axles, Chicago	11.25 to 11.75
Steel car axles, St. Louis	10.00 to 10.50
Locomotive tires, Chicago	9.00 to 9.50
Locomotive tires, St. Louis	8.75 to 9.25
Cut forge, Chicago	8.50 to 9.00
Pipes and flues, Chicago	7.00 to 7.50
Pipes and flues, Cleveland	7.25 to 7.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11.6 cents
Baltimore	14½ cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61 cents

Pipes and flues, St. Louis	5.75 to 6.25
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00 to 10.50
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.25
No. 1 busheling, Chicago	8.00 to 8.25
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.50 to 7.75
No. 2 busheling, Chicago	7.00 to 7.50
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut, St. L.	5.50 to 5.75
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.00 to 5.50
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	5.00 to 5.50
Machine shop turnings, Chicago	5.50 to 5.75
Machine shop turnings, Cleve.	5.50 to 6.00
Machine shop turnings, Cinci	$ 4.25 to 4.75
Machine shop turnings, St. L.	5.50 to 6.00
Walleable agl., Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	6.50 to 7.00
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	7.00
Malleable, railroad, St. Louis	7.00 to 7.50
Angle bars, iron, Chicago	11.75 to 12.00
Angle bars, iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo	8.25 to 8.50
Angles bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	8.25 to 8.50
Stove plate, Cleveland	7.50
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	7.25 to 7.50
Bundled sheet, Cincinnati	4.00 to 4.50

(Gross tons.)

Heavy melting steel, Pbgh	$11.75
Heavy melting steel, Buffalo	10.25 to 10.75
Heavy melting steel, Chgo	9.75 to 10.25
Heavy melting steel, Cleveland	9.75 to 10.00
Heavy melting steel, Cincinnati	9.00 to 9.50
Heavy melting steel, eastern Pa.	10.25 to 10.50
Heavy melting steel, New York	8.25 to 8.50
Heavy melting steel, St. Louis	9.25 to 9.50
Bundled sheet, Buffalo	7.00 to 7.50
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	11.75 to 12.00
No. 1 railroad wrought, Pbgh	10.25 to 10.75
No. 1 R. R. wght., New York	9.50 to 10.00
No. 1 R. R. wrought, Buffalo	10.00 to 10.50
Shafting, New York	11.50 to 12.00
Shafting, eastern Pa.	13.50 to 14.00
Wrought pipe, New York	8.00 to 8.25
Wrought pipe, eastern Pa.	10.25 to 10.50
Mch. shop turnings, New York	5.75 to 6.25
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh	7.75 to 8.00
Mch. shop turnings, eastern Pa.	7.75 to 8.25
Cast borings, New York	5.75 to 6.25
Cast borings, eastern Pa.	7.75 to 8.25
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.25 to 8.50
Stove plate, N. J. points	9.00 to 9.25
Stove plate, Pittsburgh	9.00
Stove plate, eastern Pa.	9.00 to 9.50
Shoveling steel, Chicago	9.00 to 9.50
Shoveling steel, St. Louis	8.00 to 8.50
Reroll'g rails, 5 ft. & ov., Pbgh.	12.50
Reroll. rails, 5 ft. & ov., Chgo.	9.75 to 10.25
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	10.15 to 11.25
Reroll. rails, 5 ft. & ov., St. L.	10.00 to 10.50
Steel rails, short, St. Louis	9.50 to 9.75
Steel rails, short, Chicago	10.00 to 10.25
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.50 to 9.75
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo	12.00 to 12.50
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	13.50 to 14.00
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh	13.00 to 13.50
Frogs, switches, guards, Chgo.	9.25 to 9.50
Frogs, switches & g'rds, St. L.	9.25 to 9.50
Car wheels, (iron), Pittsburgh	10.50 to 11.00
Car wheels, (steel), Pittsburgh	11.50 to 12.00
Car wheels, Chicago	10.00 to 10.50
Car wheels, eastern Pa.	10.50 to 11.00
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.25 to 9.50
Car wheels, St. Louis	10.00 to 10.50
Iron axles, Pittsburgh	18.00 to 18.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, Chicago	15.75 to 16.25
Steel car axles, New York	11.50 to 12.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.50 to 13.00
Steel car axles, eastern Pa.	13.50 to 14.00
No. 1 busheling, Buffalo	7.50 to 8.00
No. 1 busheling, Pittsburgh	9.75
No. 2 busheling, Buffalo	5.25 to 5.75
Low phosphorus steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh	13.00 to 13.25
Low phos. steel, eastern Pa.	13.50 to 14.00
No. 1 forge, eastern Pa.	7.75 to 8.25
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh	11.75 to 12.00
No. 1 heavy cast N. J. points	11.00 to 11.50
Mall. iron, R. R., Cleveland	9.25 to 9.75
Malleable railroad, Pittsburgh	9.75 to 10.00
Malleable R. R., Buffalo	9.50 to 10.00
Malleable, R. R., east Pa.	8.00 to 8.50
Bundled sheet, Pittsburgh	9.00 to 9.25
Bundled sheet, Cleveland	7.50

CENTURY WOOD BLOCKS

Durable, Economical, Resilient, Quiet, Sanitary, Easy to Truck Over

First Cost Reasonable — Maintenance Practically Nothing

Lumber of all Dimensions—Poles, Cross Arms, Conduit, Piling, Bridge Timbers.

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Also Zinc, Chloride and Creosoted Ties.

CENTURY CREOSOTED WOOD BLOCKS

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Ohio Wood Preserving Co.
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Plants: Pittsburgh, Pa. Orrville, Ohio. Reed City, Mich.

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We positively guarantee Quality and Deliveries

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COLUMBUS, OHIO

Acme Steel & Malleable Iron Works
True to Pattern
STEEL AND MALLEABLE CASTINGS
Quality Unsurpassed BUFFALO, N. Y.

Chapman Rotary Gas Producers
(Built by The C. & G. Cooper Co.)
For Open Hearth Furnaces, Billet Heating, Welding, Annealing, Lime, Brick and Cement Burning, Ore Roasting, Glass Melting and various Metallurgical and Chemical Processes. Fully described in catalogue.
CHAPMAN ENGINEERING COMPANY, Mt. Vernon, Ohio
1323 Oliver Bldg., Pittsburgh 11 Broadway, New York

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If quality counts with you—write to us.
THE L. & I. J. WHITE CO. 15 Columbia St., Buffalo, N. Y.

CASTINGS
of any description
in
Malleable and Gray Iron
Brass, Bronze or Aluminum
Write us
Illinois Malleable Iron Co.
Chicago, Ill.

How to Break Up a Bad Habit

(*Continued from page* 429.)

then. While they went mad over their war, we stuck to our last.

Try the shoe on another foot. If, perchance, your corner grocer goes out of business, you seek another. If you like the new one, you stick to him. Your old grocer opens his doors again and beckons you to come back. You see him not. If you are getting service where you are, why make a change?

There's the hub of the question. Service. Its the hub of every industrial question. If the American producer with his new sphere of trade cannot deliver service to his customers both at home and abroad, this diverted trade will of a certainty spring back to its old channels, regardless of war, boundaries, conquest, land power, sea power or any other conventional force. Trade is the most independent thing on earth. It refuses to be coerced; it bows to no man's flag. Its logic is searching. It jeers at sentiment. It follows only the cold, blue light of reason. Service is its trail across all the seas that surge, quality and price are its beacon lights.

An American salesman goes into a hardware shop in Rio Janeiro, he shows his wares, all the American styles. He states with Yankee persistence what he thinks should be used in Rio. The German salesman calls, he politely asks the dealer what is vogue in Rio for the year, then prepares to furnish those styles. Who is right? There is no argument. The American salesman must learn the difference between the rural dealer in his Kansas or Dakota districts and Rio Janeiro. In America the suburbanites buy what the city buys because it is the city. In South America they will not follow New York nor any other American city. The American tells them what they want, the German asks them what they want. It seems like a small difference, but it stands for the difference in a national policy. They go to a different school down there; the salesman must grasp this or lose the field not only in South America, but in South Africa, China and elsewhere.

The Peddler is Busy

So America is fast awakening to its need. The European peddler at present no longer unslings his pack at our door. He's too busy slinging a knapsack, but have a care, he will be back again. In the meantime, American genius can adapt itself to this change, of that there is no question whatever. But we must acquire the German patience, to take pains in little things, and the tact so necessary in foreign trade. We must not be so bigoted we can't take the other fellow's view. Without that our genius will avail us nothing. If we lack that we will lose these new fields as fast as we have found them.

Some one asked Edison if genius was not a matter of inspiration; he said: "No, perspiration." So with our new-found foreign trade; it is not a matter of genius, but tact and persistence.

Taxing Minnesota Mineral Rights

In the fourth biennial report of the Minnesota tax commission, the following interesting comments on the taxing of mineral rights are given:

The taxing of mineral rights, the ownership of which is separated from the ownership of the surface, is a perplexing question. All property should be taxed on a percentage, as provided by law, of its true and full value, and here is where the difficulty arises.

There is no doubt that the mineral right has been reserved in many cases where there is no mineral, and

it would be impossible to tax it on any value. If any value were put upon it, it would necessarily be so low that the tax would be nominal and not bring enough money in taxes to pay the additional expense of putting it on the tax books and collecting the tax.

Mineral rights have been reserved in lands so far removed from any known ore bodies that the possibility of ore in them is very remote and the mineral rights practically worthless. In such cases, to ascertain whether there is a possible value to the mineral rights, it would take the opinion of a geologist to determine whether there is any possible chance for minerals and how much that chance is actually worth. This would be an expense to the state which might not be worth while. In some sections where mineral rights have been reserved the geologists have stated no iron ore can possibly exist.

The complaint is frequently made by the owner of the surface that he is paying taxes on both the surface and the mineral right. As a matter of fact, in most of these cases, in the opinion of the assessor, there is no value to the mineral rights and no additional value or tax is imposed on the owner of the surface on account of them.

At present all lands on the iron ranges are taxed with reference to their possible value for iron ore. If any man owns the surface alone on such lands he has a perfect right to have the surface and the mineral rights assessed and taxed separately on demand.

To determine all the lands in the state in which mineral rights have been reserved would be an expensive procedure, and the returns in taxes would probably not equal the expense.

Several counties have, by searching the records, determined all lands in which minerals are reserved and taxed the mineral rights separately. In these cases the cost has been greater than, as it now appears, the returns ever will be.

In any case, where the assessor has taken into consideration the value of the minerals and placed a value thereon, and that value has been added to the surface value and both taxed against the property as a whole, the owner of the surface, or the owner of the mineral rights, has a perfect right to demand of the auditor that the mineral rights and the surface be taxed separately.

This provides a way for the owner of the surface to pay taxes on the surface only and also does the same for the owner of the mineral rights.

Russian Mineral Resources

Veins of cinnabar are found in Daghestan, Tersk, Kuban, and the Transbaikal, in the Urals, in the Nerchinsk district and Yekaterinoslav province. Seams of lead exist in the Caucasus, in the Don province, near Vladikavkaz, in the Altai, and the Nerchinsk district. But the domestic output of both of these minerals does not suffice to cover the demand, and as against an annual yield of 1,445 short tons of lead, 54,000 tons have to be imported. Of mercury about 180 tons are imported every year. Zinc abounds in Poland, the Caucasus, Finland, the Donetz region, and the Nerchinsk district, but the output represents only one-third of the domestic consumption. Bismuth, arsenic, pyrites, magnesium and lithium are found in European Russia and Siberia, but on account of their defective exploitation a large annual import continues. Manganese constitutes an exception; its working has attained considerable development.

The amount of coal mined in the United States in 1914, according to figures compiled by the United States geological survey, was greater by 80,000,000 tons than the total which had been mined up to the close of the year 1871.

High-Grade Tin and Terne Plates
Genuine Charcoal and Iron Terne Plates
The Carnahan Tin Plate & Sheet Company
Canton, Ohio
Specialties → Blued and Polished Steel, Deep Drawing Steel, Automobile Sheets, Full Finished Enameling and Ceiling Stock, Etc.

TISCO MANGANESE STEEL CASTINGS
FOR SEVERE SERVICE
Taylor-Wharton Iron & Steel Co.
High Bridge, New Jersey

SMALL STEEL CASTINGS
OF THE BEST QUALITY ARE OUR SPECIALTY. WRITE US.
FARRELL-CHEEK STEEL FOUNDRY CO.
SANDUSKY, OHIO

Rivets, Burrs, Bolts and Screws
THE FALLS RIVET CO.
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Detroit Representative: Mr. H. Temple Barber, Ford Bldg.
Chicago Representative: Theo. Geissman & Co., McCormick Bldg.
St. Louis, Mo., Representative: Heimbuecher Metal Products Co., 514 N. 3d St.

Woodmansee & Davidson, Inc.
ENGINEERS
All Kinds of Power Plants
SPECIALISTS in the Industrial Application of PRODUCER GAS
MILWAUKEE, Wells Bldg. CHICAGO, 1st National Bank

Malleable Iron CASTINGS
Of HIGH TENSILE STRENGTH and EXCEEDINGLY TOUGH *Large or small*, we are equipped to make your castings, and guarantee complete satisfaction It is our business to serve you. Quick delivery our specialty *Write us*
The General Malleable Company
WARREN, OHIO

Opportunities

Men Wanted
Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

SAVE YOUR POSTAGE! When answering advertisements, simply address your replies in the usual manner and send to us for reforwarding under one cover.

AND THE RESULTS HAVE POINTED OUT THE IMPORTANCE OF CONTINUING THE AD.

The Iron Trade Review, Cleveland, Ohio. Blankville, Pa., Jan. 21st, 1915.

Dear Sirs:—

Enclosed please find check for $4.47 for a continuation of the insertion of my ad., **Box 257**, as per my letter of last October and the 21st of last month.

While the insertions so far **have resulted in a most excellent opening** in the future yet it is at such an indefinite time, due to present conditions, that it might not develop for a year or so and I should prefer to get located before that time.

These four insertions should, I believe, run up to and including Feb. 18th. Yours truly,

A Subscriber

If you're a high grade man

REMEMBER!

The best positions are most easily secured through

THE IRON TRADE REVIEW, Published at Cleveland, O.

TRY IT!

Men Wanted

UNDERSIGNED COUNSEL WILL CONfidentially negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Lock Box 134-E9, Buffalo, N. Y.

TREASURER.

Large manufacturing corporation, established 1850, location Canada, has a vacancy for a highly efficient business man as Secretary and Treasurer. Party must be able to invest at least $5,000 cash and give best of references as to ability and character. Contract with good salary guaranteed to right party. Investment absolutely secured. Answer in full or no attention paid. Address Box 344, THE IRON TRADE REVIEW, Cleveland, O.

WANTED:—A SALESMAN WITH SHOP experience to sell special steels. State references, age, experience and qualifications for selling. Address Steel, P. O. Box 822, New York City.

NICKEL ANODE MAKER WANTED: Must be a thoroughly competent man; state experience and wages expected. John C. Wiarda & Co., 273 Green St., Brooklyn, N. Y.

SALES MANAGER.

A Canadian farming implement manufacturing corporation has an opening for an experienced sales manager, (preferably with experience in the above line) to take full charge of sales department. Attractive salary and commission contract guaranteed to right party. $2,500 cash investment and A-1 references required. This is a high grade proposition for a high grade man. Correspondence treated strictly confidential. Address Box 345, THE IRON TRADE REVIEW, Cleveland, O.

WANTED:—EXPERIENCED TOOLroom man for the selling of special steels. State reference, age, experience and qualifications for selling. Address H. S., P. O. Box 822, New York City.

THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

FACTORY SUPERINTENDENT.

Position vacant for a high grade factory superintendent, with executive ability, to take full charge of all branches of a farming implement factory in Canada. Applicants must be able to invest $2,500 cash and move to Ontario, Canada, at once. Contract with good salary guaranteed to right party. Investment covered by guaranteed security. Address Box 346, THE IRON TRADE REVIEW, Cleveland, O.

CHEMIST WANTED:—MUST BE COMpetent to do all regular and special laboratory work in connection with blast furnaces. Address Box 349, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

GENERAL SUPERINTENDENT OF blast furnace and coke oven plant, 1,000,000 tons pig iron capacity, and manager of fabricating shop, 60,000 tons capacity, good organizer of men and efficiency methods, low cost records, 20 years' practical experience in designing, erecting and operating desires to connect with firm on salary and bonus basis. Best of references. Address Box 257, THE IRON TRADE REVIEW, Cleveland, O.

UP-TO-DATE MALLEABLE MAN DEsires position as superintendent or general foundry foreman; thorough in all branches. Address Box 271, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

YOUNG MAN, (29), TECHNICAL TRAINing, former assistant M. M. of large steel mill, open for engagement. Address Box 25, THE IRON TRADE REVIEW, 90 West St., New York City.

GRADUATED MECHANICAL ENGIneer; 32 years; hustler; good experience in machine shop, and several years' experience as designer in steel plant work desires position not confined to drafting office only; willing to start for reasonable salary; best of ability and character references furnished; employed at present. Address Box 337, THE IRON TRADE REVIEW, Cleveland, O.

Classified Advertisements continued on following page